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OCT 23 1997

DOE-0084-98

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

SUBMITTAL OF REVISED ON-SITE DISPOSAL FACILITY IMPACTED MATERIALS PLACEMENT PLAN (REVISION I) AND RESPONSES TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS

This letter submits responses to comments from the U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) on the On-Site Disposal Facility (OSDF) Impacted Materials Placement Plan (Revision H). Also enclosed is the revised Impacted Materials Placement Plan (Revision I) that incorporates these comments.

The most significant revision to this document is the deletion of placement and compaction procedures for oversized material and overlength steel. In addition, the *Specialized Placement Plan No. 1, Oversized Metals and Overlength Structural Steel Beams/Columns* has been canceled. A number of other clarifications have been made to the Impacted Materials Placement Plan as a result of OEPA's comments.

If there are any questions regarding these submittals, please contact Jay Jalovec at (513) 648-3122.

Sincerely,

Johnny Reising

FEMP: Jalovec

Johnny W. Reising
Fernald Remedial Action
Project Manager

Enclosures: As Stated

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IMPACTED MATERIALS PLACEMENT PLAN ON-SITE DISPOSAL FACILITY

20100-PL-007
Revision I
October 1997

United States Department of Energy

Fernald Environmental Management Project
Fernald, Ohio

Prepared by

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Under

Fluor Daniel Fernald
Subcontract 95PS005028

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1.0 INTRODUCTION

1.1 Overview

This Impacted Materials Placement (IMP) Plan describes the impacted materials acceptance, placement, compaction, and quality assurance/quality control (QA/QC) activities that will be undertaken throughout construction, filling, and closure of the On-Site Disposal Facility (OSDF) at the Fernald Environmental Management Project (FEMP), Fernald, Ohio.

1.2 Project Description

The OSDF will be constructed to contain impacted materials derived from remediation of the operable units at the FEMP. These materials will be required to meet OSDF waste acceptance criteria (WAC) prior to disposal in the OSDF. The estimated total volume of impacted material destined for OSDF disposal is 2.5 million cubic yards (1.9 million cubic meters) bank/unbulked. Approximately 85 percent of this material is impacted soil or soil-like material, with the remainder consisting of building demolition debris, lime sludge, municipal solid waste, and small quantities of miscellaneous other materials.

The construction, filling, and closure of the OSDF is currently scheduled to occur over a period of approximately seven years, as described in the Accelerated Remediation Plan [$276 million case] (276 Plan). However, due to the potential for variations in the pace of remedial action activities, the OSDF has been designed to be constructed, filled, and closed in phases for up to 25 years.

The design approach for the OSDF is presented in the document, *Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2 (OU2 RDWP)* [DOE, 1995b]. The design of the OSDF, as currently developed, is presented in the *Final Design Package, On-Site Disposal Facility* [GeoSyntec, 1997c]. The design of the OSDF includes a liner system, final cover system, leachate management system, and surface-water management system.

1.3 Plan Scope

This plan establishes the operational procedures to be used by the Subcontractor to place, compact, and protect impacted material placed in the OSDF. The scope of this IMP Plan includes:

- presenting radiological/chemical and physical waste acceptance criteria applicable to OSDF impacted materials;
- categorizing impacted material types based on handling, placement, and compaction requirements;
- developing acceptable proportions of the various impacted material types to be placed within any area of the OSDF to achieve satisfactory OSDF performance;

- developing procedures for placing and compacting impacted materials in the OSDF; and
- developing QA/QC procedures for impacted material placement in the OSDF.

1.4 Plan Organization

The remainder of this plan is organized as follows:

- the criteria used in establishing the requirements of this IMP Plan are presented in Section 2.0;
- the design features of the OSDF applicable to this IMP Plan are presented in Section 3.0;
- impacted material waste acceptance criteria are described in Section 4.0;
- descriptions of the impacted materials to be placed in the OSDF are presented in Section 5.0;
- general procedures for handling, placement, and compaction of impacted materials in the OSDF are presented in Section 6.0;
- specific procedures for handling, placement, and compaction of soil and soil-like impacted materials are presented in Section 7.0;
- specific procedures for handling and placement of special impacted materials are presented in Section 8.0;
- measures to be taken for the control of impacted runoff and fugitive dust related to, or resulting from, the placement of impacted materials are described in Section 9.0;
- required documentation procedures are presented in Section 10.0;
- seasonal cover requirements are presented in Section 11.0; and
- regulatory and technical references cited in this plan are listed in Section 12.0.

Appendix A to this IMP Plan contains an IMP Quality Assurance Plan. The IMP Quality Assurance Plan describes those activities that the Construction Quality Control (CQC) Consultant will undertake to establish that the Subcontractor complies with this IMP Plan.

This IMP Plan uses several key phrases which are critical to the development of a complete understanding of the Plan. The terms and their usage within this plan are briefly explained as follows:

"lift" usage common to earthwork

"grid" refers to a 100 ft. by 100 ft. (30 m by 30-m) grid system for each cell, which provides the control for management of impacted material placement

"horizon" a horizontal stratum limited horizontally to a 100 ft. by 100 ft. (30 m by 30 m) grid element, and limited vertically by either the maximum height of the item(s) therein or by the maximum number of lifts therein

1.5 Plan Responsibilities

This plan describes work to be conducted by three separate organizations:

- *Construction Manager (CM)* — Responsibilities include: overall coordination between all the parties to the FEMP; directing the construction management team; contractual management responsibility over the Subcontractor; specifying the materials requiring OSDF disposal; providing security for OSDF operations; implementing construction safety; providing emergency health and safety response teams; and oversight of the OSDF Construction Quality Assurance Plan.

- *Subcontractor* — Responsibilities include: separating impacted materials into categories; loading and hauling impacted materials to the OSDF; routing impacted materials within the OSDF battery limit; placing impacted material in the OSDF; obtaining final grade lines as shown on the Certified-For-Construction (CFC) Drawings; compacting (or compacting around and over) impacted material in the OSDF; and controlling the generation of fugitive dust and managing impacted stormwater runoff.

- *CQC Consultant* — Responsibilities include: checking the Subcontractor's impacted material category classification; spot-checking impacted material shipments for conformance with the OSDF WAC prior to those shipments arriving at the OSDF battery limit; verifying the Subcontractor's choice of location for impacted material placement; documenting that the Subcontractor followed the placement and compaction procedures required by this IMP Plan; and conducting compaction tests of materials placed in the OSDF.

1.6 Related Plans

Several other plans have been prepared and should be used in conjunction with this IMP Plan. The other plans containing information relevant to this IMP Plan are listed below along with a brief statement of the relationship to this plan.

- *OSDF Construction Quality Assurance (CQA) Plan* [GeoSyntec, 1997a]: describes the quality assurance procedures that will be followed by CQC Consultant during construction, filling, and closure of the OSDF;

- *OSDF Systems Plan* [DOE, 1997b]: contains procedures for inspecting and monitoring the OSDF including the leachate management system, final cover system, and temporary facilities;

- *OSDF Surface Water Management and Erosion Control (SWMEC) Plan* [GeoSyntec, 1997d]: provides procedures for the management of surface water in and around the OSDF and details of temporary and permanent erosion and sediment controls for the OSDF; and

- *Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility* [DOE, 1997c]: establishes the strategies for ensuring that the OSDF WAC presented in this IMP Plan are met upon disposal in the OSDF.

The Subcontractor shall be responsible for preparing an IMP health and safety (H&S) plan that meets all health and safety requirements identified in the FEMP Project Specific Health and Safety Requirements Matrix (PSHSRM). In addition, the H&S personnel will perform periodic audits of the Subcontractor to ensure compliance; H&S personnel will have stop-work authority (in the event of threat to worker and/or public safety) until the proper corrective action is taken. The H&S Officer assigned to the OSDF project will be the single point of contact for all safety, industrial hygiene, fire protection, and radiological issues or concerns.

In addition to H&S personnel assigned to the project, the Subcontractor will be required to provide a H&S field representative who will be responsible for the Subcontractor's compliance with all H&S requirements. The Subcontractor will be required to report all safety concerns and incidents to the H&S Officer.

Radiological technician(s) will also be assigned to the OSDF project. In conjunction with the H&S Officer assigned to the project, the radiological technician(s) will help to ensure radiological compliance throughout the project. Radiological compliance includes the radiological monitoring of equipment and materials entering and leaving the job site, radiological monitoring of soil during excavations to help ensure proper segregation, storage, or disposition; radiation work permit compliance, routine inspection, monitoring, and recording of area radiation detection monitors, and radiological monitoring of personnel, if necessary. The PSHSRM will be the basis for the required monitoring and will identify the action levels that will ensure personnel safety by limiting exposure.

2.0 PERTINENT REQUIREMENTS

2.1 Overview

Regulatory and other requirements pertinent to this plan primarily take the form of applicable or relevant and appropriate requirements (ARARs) and to be considered criteria (TBCs) as determined by the record of decision for each of the various FEMP operable units, functional requirements, and general design criteria. In general, these criteria are intended to result in impacted material management activities that: (i) are protective of the OSDF liner system, leachate management system, and final cover system; (ii) result in an OSDF waste mass that is stable and does not undergo unacceptable levels of differential settlement; and (iii) provides acceptable management of the generation of fugitive dust and the routing and containment of impacted runoff.

2.2 ARARs and TBCs

ARARs and TBCs that should be addressed by this plan are provided here, as obtained from the *Final Record of Decision for Remedial Actions at Operable Unit 2 (OU2 ROD)* [DOE, 1995a], the *Final Record of Decision for Remedial Actions at Operable Unit 5 (OU5 ROD)* [DOE, 1996a], the *Operable Unit 3 Record of Decision for Final Remedial Action (OU3 ROD)* [DOE, 1996b], or the *Permitting Plan and Substantive Requirements for the On-Site Disposal Facility (OSDF Permitting Plan)* [DOE, 1997a], as identified.

	Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	OSDF Permitting Plan
1	Ohio Particulate Matter Standards—Restriction of Emission of Fugitive Dust OAC 3745-17-08	Requires the use of reasonably available dust control measures to prevent fugitive dust from becoming airborne and defines "reasonably available control measures".	✓	✓	✓	
2	Ohio Permit to Install New Sources of Air Pollution—Best Available Technology (BAT)	Requires the installation or modification and operation of an air contaminant source to employ the best available technology for pollution control.	✓	✓	✓	
3	Ohio Solid Waste and Infectious Waste Regulations—Operational Criteria for a Sanitary Landfill Facility OAC 3745-27-19(E)(30)	Prohibits disposal of whole scrap tires and shredded whole scrap tires in a sanitary landfill facility.			✓	✓

	Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	OSDF Permitting Plan
4	Ohio Asbestos Emission Control—Standard for Active Asbestos Waste Disposal Sites OAC 3745-20-06	Prohibits visible emissions from asbestos-containing materials during placement, and requires at least 12 inches of cover of compacted non-asbestos containing material over that asbestos-containing material as soon as practicable but no less often than at the end of each operating day.			✓	✓
5	Ohio Asbestos Emission Control—Standard for Inactive Asbestos Waste Disposal Sites OAC 3745-20-07(A)&(C)	Prohibits visible emissions from asbestos-containing materials from an inactive asbestos waste disposal site, and requires at least 6 inches of cover of compacted non-asbestos containing material over that asbestos-containing material and growth and maintenance of a cover of vegetation on an area adequate to prevent exposure of the asbestos-containing waste material, or at least 2 feet of cover of compacted non-asbestos containing material, and maintenance of that cover to prevent exposure to the asbestos-containing waste material.	✓		✓	✓
6	Ohio Solid Waste and Infectious Waste Regulations—Sanitary Landfill Facility Construction OAC 3745-27-08(C)(6)	Requires placement of impacted materials to be performed such that the cell always stores runoff from active and open portions of the cell resulting from the 25-year, 24-hour storm event.	✓	✓	✓	✓
7	Radiation Protection of the Public and the Environment DOE Order 5400.5, Chapter I(4) and II(2)	Requires application of "As Low As Reasonably Achievable" (ALARA) goals to all activities in the excavation, removal, handling, and placement of impacted materials.	✓	✓	✓	

2.3 Functional Requirements

A variety of functional requirements have been established by DOE for the OSDF. The functional requirements applicable to this plan are given below:

- Facilities for impacted material management should:
  - be located in areas that can easily and efficiently accommodate receipt of impacted material from the various FEMP operable units;
  - be separated from clean areas;
  - limit the uncontrolled discharge of fugitive dust to acceptable levels;
  - limit the generation of wastewaters to acceptable levels;
  - comply with project health and safety requirements;
  - be removed at the completion of impacted material management activities, with the disposal of affected materials in the OSDF; and
  - be designed to minimize the generation of new impacted material.
- Impacted materials should be placed in the OSDF in a safe and cost-effective manner that prevents the uncontrolled release of impacted materials to the environment.
- This plan, in conjunction with the various operable unit remedial action planning documents, must only allow the placement of material satisfying the OSDF WAC.

2.4 General Design Criteria

A number of general design criteria have also been identified for the OSDF. The general design criteria applicable to this plan are:

- To the extent the stockpiling of impacted soil is necessary, the soil should be stockpiled in the FEMP former production area in order to use the existing storm drainage control system.
- Procedures should be employed that reduce the need for the use of respirators by on-site workers.
- Material transport procedures should cause minimal disturbance to the site and work area and be coordinated with impacted material removal and placement activities.

- Material transport equipment requirements should address the need to transport a variety of materials so that the number of pieces of equipment required to implement the design is minimized and should address the control of airborne particulate emissions.

- The Subcontractor must control the release of fugitive emissions (including dust, radiological, chemical, and asbestos materials) so that air quality standards are not violated on the site and so that releases are controlled to acceptable levels at the fence line.

- Fugitive dust will be controlled through the implementation of the BAT determination for remedial construction activities on the FEMP site.

- Acceptable emission control methods during placement operations include:

  - transport in dump trucks;

  - closed containers with metal or tarp lids;

  - keeping impacted material moist; and

  - spraying earthen material with a crusting agent when necessary;

- Impacted material placement procedures should take into account:

  - the rate and time at which impacted material will be available for placement in the cell;

  - the types of impacted material available for disposal (*i.e.*, soil, flyash, lime sludge, solid waste, or building demolition debris);

  - the potential for bulking/shrinkage of impacted material during placement;

  - the availability of temporary stockpile capacity;

  - the extent to which the disposal cell is constructed and available to receive impacted material; and

  - the need for suspended or reduced impacted material placement activities during winter and the need for seasonal (winter) cover.

- Impacted material placement activities should be organized to achieve the following objectives:

  - Impacted material should be placed in a manner that is protective of the liner system and final cover system.

- Impacted material should be placed to minimize differential settlement to the extent reasonably achievable.

- A minimum of 3 ft. (0.9 m) thickness of select impacted material should be placed directly over the protective layer component of the liner system, and beneath the contouring layer component layer of the final cover system, to provide protection of these systems from damage by impacted materials. The thickness of select impacted material over the protective layer may be decreased to 2 ft. (0.6 m) if the first lift of material to be placed over the select impacted material consists of soil or small size debris that can be placed in controlled lifts.

- To limit particulate emissions, generation of wastewaters, and erosion of impacted material, the sequence of placement should minimize the area of exposed impacted material.

- Materials should be placed in a manner that results in a disposal pile with relatively homogenous large-scale mechanical properties (*i.e.*, compressibility and shear strength), to the extent possible; homogeneity should be achieved by distributing impacted materials throughout the OSDF to avoid large pockets or distinct concentrations of any one type of impacted material in a particular area; the objective is to minimize the potential for differential settlement.

- At the end of each work day, the impacted material surface should be graded and maintained to control precipitation runoff and impacted material erosion.

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3.0 OSDF FEATURES

3.1 General

The primary features of the OSDF related to the placement of impacted materials are the liner and final cover systems and certain support elements. These features are briefly described in this section. The Subcontractor shall be responsible for implementing the requirements of this section and for the protection and safety of the systems described in this section during OSDF construction, filling, and closure.

3.2 Impacted Materials Placement Zones

Control of the placement of impacted material in the OSDF during construction, filling, and closure is required in order to: (i) protect the OSDF liner system, final cover system, and leachate management system from damage; (ii) maintain the impacted material in a stable configuration; (iii) limit fugitive dust to an acceptable level; (iv) allow containment of impacted runoff within the active OSDF cell; and (v) limit differential settlement of the OSDF final cover system to an acceptable level. Details of the liner system and final cover system proposed for the OSDF are shown on the CFC Drawings.

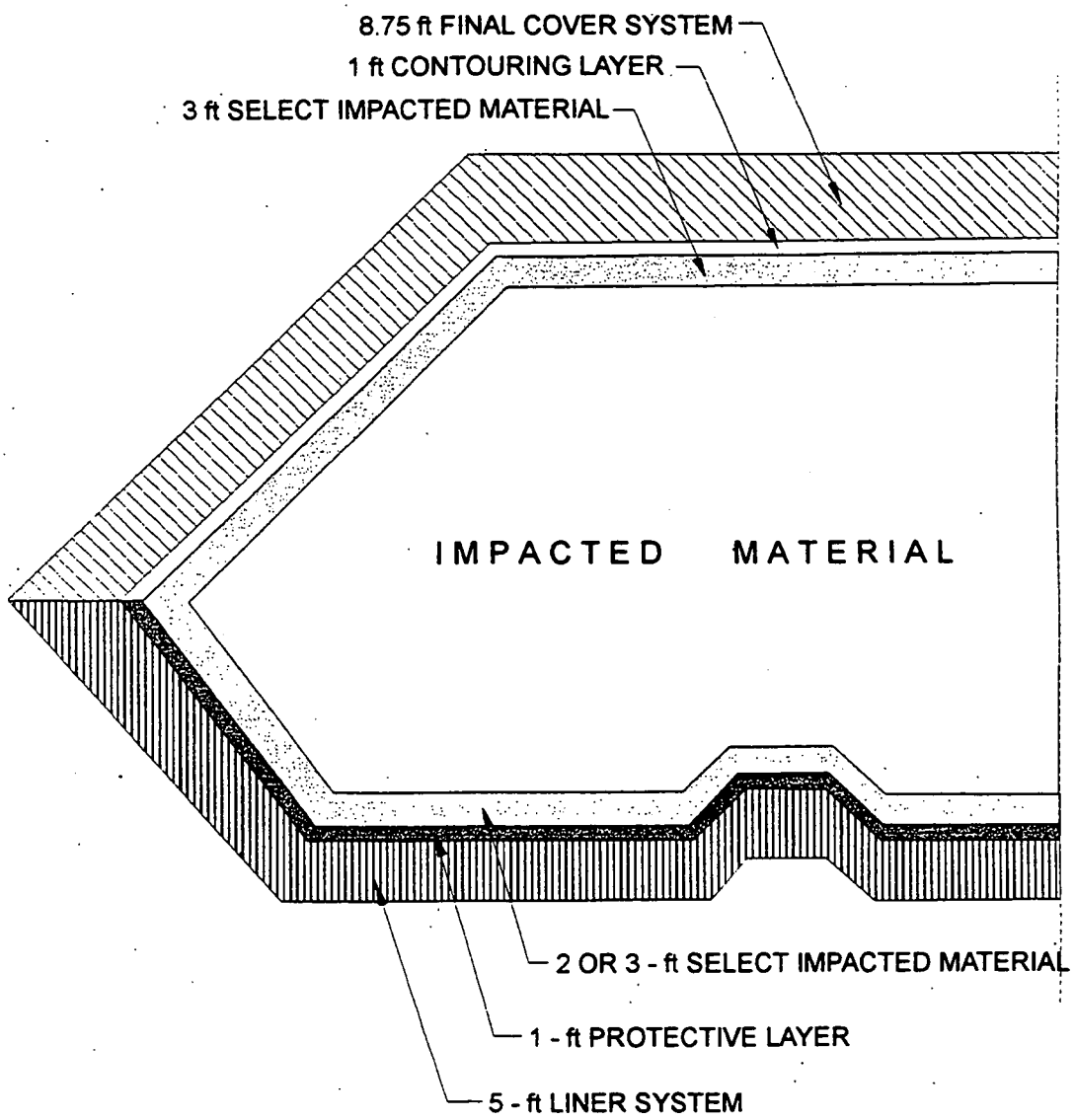
Within each OSDF cell, four zones exist in which impacted material may be placed. These zones and their relative locations with respect to the OSDF liner system and final cover system are shown in Figure 3-1. The four zones are as follows:

- *Protective layer* — a protective layer of impacted soil material shall be placed directly over the primary leachate collection system on the base of each OSDF cell; the soil used for the protective layer shall be either: (i) on-site till material with a maximum particle size not exceeding 3 in. (75 mm) (ASTM C 136); or (ii) granular drainage material meeting the material requirements of the project specifications and placed in specified areas of each cell to facilitate vertical percolation of impacted runoff into the underlying leachate collection system;

- *Select impacted material layer* — select impacted material shall be placed both on top of the protective layer and beneath the contouring layer to provide a physical barrier between debris and other "large-size" impacted material and the OSDF liner and final cover systems; the select impacted material shall consist of impacted soil or soil-like material with a maximum particle size not exceeding 6 in. (150 mm) (ASTM C 136);

- *Impacted material layers* — a variety of different impacted materials can be placed on top of the select impacted material layer in the central portions of an OSDF cell; the impacted material in this zone need only meet the radiological/chemical waste acceptance criteria established for the OSDF, the physical waste acceptance criteria established in this IMP Plan, and the placement and compaction criteria established in this IMP Plan; and

IMPACTED MATERIAL ZONES
(NORTH - SOUTH CROSS SECTION SHOWN)



NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. SUBCONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS.

GeoSyntec Consultants
ATLANTA, GEORGIA

FIGURE NO.	3-1
PROJECT NO.	GQ0166-06
DOCUMENT NO.	F9620002.CDI
FILE NO.	FIG-6-3.CDR

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- *Contouring layer* — a contouring layer of impacted soil material shall be placed directly over the select impacted material layer, prior to installation of the OSDF final cover system; the soil used for the contouring layer shall be a till material with a maximum particle size not exceeding 3 in. (75 mm) (ASTM C 136).

3.3 OSDF Support Facilities

3.3.1 Impacted Material Haul Roads

The impacted material haul roads within the OSDF battery limit are designed to laterally contain material that may spill from trucks during transportation and also impacted runoff resulting from precipitation falling onto the roads. Trucks used for impacted material transport shall be suitable for the roadway design. Surfacing for the impacted material haul roads is designed to provide adequate support to the hauling units and a relatively tight texture to promote runoff. Surfacing materials used in the construction of impacted material haul roads shall be removed and disposed in the OSDF when the segment of roadway is no longer needed for impacted material placement activities.

Runoff from impacted material haul roads within the OSDF battery limit shall be managed as impacted runoff (*i.e.*, a form of wastewater). This water shall be contained, collected, and discharged to the storm drainage control system of the FEMP former production area, or to other on-site wastewater collection/conveyance points acceptable to the CM. Impacted material haul roads outside the OSDF battery limit are addressed as part of other plans prepared for the integrated FEMP remediation.

3.3.2 Impacted Soil Stockpile Areas

During initial construction of the OSDF, and periodically during filling and closure, it will be necessary to temporarily stockpile impacted soil resulting from OSDF excavation activities. An impacted soil stockpile area shall be developed to temporarily stockpile this material. The area used for stockpiling shall be graded flat and separated from surrounding areas by a 2 ft. (0.6 m) high soil berm. At the end of each day's work, the impacted soil stockpile shall be lightly compacted and rolled smooth to reduce precipitation infiltration into the pile and control fugitive dust. Any stockpile that will remain inactive for more than 30 days shall be covered with either a crusting agent or geosynthetic cover. Grassing of impacted soil stockpile areas may be considered if the soil is suitable for establishment of a vegetative cover. Runoff from the stockpile shall be controlled and routed to the FEMP former production area storm drainage control system, or to other on-site wastewater collection/conveyance points acceptable to the CM.

Impacted soil excavated during construction of the first and subsequent OSDF cells and related support facilities shall be used for construction of the liner system protective layer and the select impacted material layer for those cells if meeting the requirements for those layers. Any geosynthetic cover used in the impacted soil stockpile area and other impacted soils from the operation shall be disposed in the OSDF as part of the impacted material placement activities described later in this plan.

3.3.3 Impacted Material Staging Areas

Impacted material staging areas consist of gravel or concrete hardstands constructed to temporarily store impacted structural members and other building demolition debris. These areas will be used to temporarily stage any material not able to go directly from the material source to an active OSDF cell. Impacted material staging areas constructed outside the limits of the FEMP former production area shall have positive runoff control. Any runoff from these areas will be directed to the storm drainage control system of the FEMP former production area or to other on-site wastewater collection conveyance points acceptable to the CM.

4.0 WASTE ACCEPTANCE CRITERIA

4.1 General

This section of the IMP Plan presents information regarding the waste acceptance criteria applicable to the OSDF. Radiological/chemical waste acceptance criteria developed by the individual operable units at the FEMP are identified and made a part of this plan. Other physical criteria are established in this plan.

4.2 OSDF Chemical/Radiological Waste Acceptance Criteria

The OU2 ROD has established a radiological waste acceptance criteria of 346 picoCuries/gram (pCi/g) of uranium-238 or 1,030 milligrams per kilogram (mg/kg) of total uranium for operable unit remediation materials destined for the OSDF. Similarly, the OU5 ROD established additional radiological and chemical waste acceptance criteria for Operable Unit 5 remediation soils destined for the OSDF. Similarly, the OU3 ROD has established a radiological waste acceptance criteria of 105 grams technetium-99 for Operable Unit 3 remediation debris materials. These waste acceptance criteria have been compiled and are presented in Table 4-1. The remediation materials sent to the OSDF from Operable Unit 3 (see Table 5-1) may also include small material contributions from Operable Units 1 and 4; any structural debris material resulting from decontamination and dismantlement of the remediation facilities from these latter operable units destined for the OSDF must meet the Operable Unit 3 waste acceptance criteria.

4.3 Physical Criteria

The physical criteria (dimensions given are considered nominal) that shall be applied to material destined to the OSDF are:

- materials from various building components (*i.e.*, steel, concrete, masonry rubble, finish components, *etc.*) shall be segregated at the staging area by the Subcontractor;
- the maximum length of irregularly shaped metals or other components of a building superstructure or finish component shall be 10 ft. (3 m);
- the maximum thickness of irregularly shaped metals or other components of a building superstructure or finish component shall be 18 in. (450 mm);
- the maximum thickness of concrete or other components of a building slab or substructure shall be 18 in. (450 mm) when the materials are part of a load of similar material;

Table 4-1
ON-SITE DISPOSAL FACILITY
WASTE ACCEPTANCE CRITERIA

	Constituent of Concern	Soil[a]		Debris[b]
		OU2	OU5[d]	OU3
	Radionuclides:			
1	Neptunium-237		3.12×10^{9} pCi/g	
2	Strontium-90		5.67×10^{10} pCi/g	
3	Technetium-99		29.1 pCi/g	105 g
4	Uranium-238	346 pCi/g		
	Total Uranium	1,030 mg/kg	1,030 mg/kg	
	Inorganics:			
5	Boron		1.04×10^{3} mg/kg	
6	Mercury[c]		5.66×10^{4} mg/kg	
	Organics:			
7	Bromodichloromethane		9.03×10^{-1} mg/kg	
8	Carbazole		7.27×10^{4} mg/kg	
9	Alpha-chlordane		2.89 mg/kg	
10	Bis(2-chloroisopropyl)ether		2.44×10^{-2} mg/kg	
11	Chloroethane		3.92×10^{5} mg/kg	
12	1,1-Dichloroethene[c]		11.4 mg/kg	
13	1,2-Dichloroethene[c]		11.4 mg/kg	
14	4-Nitroaniline		4.42×10^{-2} mg/kg	
15	Tetrachloroethene[c]		128 mg/kg	
16	Toxaphene[c]		1.06×10^{5} mg/kg	
17	Trichloroethene[c]		128 mg/kg	
18	Vinyl chloride[c]		1.51 mg/kg	

NOTES:
[a] maximum concentration
[b] maximum total mass
[c] RCRA-based constituent of concern
[d] constituents which have established maximums which serve as Waste Acceptance Criteria; other compounds which will not exceed designated Great Miami Aquifer action levels within 1000-year performance period, regardless of starting concentration in the OSDF, are not listed.

SOURCES:
OU2 ROD [DOE, 1995a]
OU5 ROD [DOE, 1996a]
OU3 ROD [DOE, 1996b]

- the maximum cross-sectional dimension of an individual concrete member or other component of a building slab or substructure shall be 4 ft. (1.2 m) when the item is handled individually and is a regular, rectangular shape having no concrete protrusions greater than 18 in. (450 mm);

- concrete reinforcement bars shall be cut within a nominal 12 in. (300 mm) of the concrete mass;

- the maximum thickness of uniform pallets of building cladding (*e.g.*, transite panels) properly banded into rectangular shapes shall be 4 ft. (1.2 m);

- regulated asbestos containing material (ACM) shall be double-bagged at the source and delivered unmixed with other materials;

- ACM brick and commingled debris shall be double-contained and segregated at the source;

- piping having insulation of ACM shall be segregated at the source and delivered unmixed with other materials;

- general building rubble consisting of wood, drywall, HVAC systems, electrical systems, plumbing systems, and minor equipment shall be sufficiently reduced in size to be gradeable into a 18 in. (450-mm) lift by equipment similar to a Caterpillar D-8 bulldozer;

- equipment shall be drained of all oils and liquids;

- piping with a nominal diameter of 12 in. (300 mm) or greater will be split in half; and

- the maximum dimension of general building rubble consisting of concrete, masonry, and other similar materials shall be 18 in. (450 mm).

Impacted materials brought to the OSDF should not be at such a high moisture content that impacted material placement and compaction activities are impeded. Generally, soil should have a moisture content that allows the material to be compacted to the required relative compaction using standard soil compaction equipment and procedures. Soil should also have a moisture content that does not result in excessive "bleeding" of liquids. As necessary, the CM will direct the Subcontractor to dry the soil by disking and air drying, by blending with drier soil, or by other means so that the soil can be compacted to the required percent of standard Proctor dry density. The Subcontractor shall limit the use of in-cell drying to the extent necessary to not restrict the placement of impacted material in the OSDF.

4.4 Prohibited Items

The following are specifically prohibited from disposal in the OSDF:

- impacted material exceeding WAC presented in Table 4-1;
- impacted material that is "characteristically hazardous" ("RCRA characteristic waste"), as defined in the OU2, OU3, and OU5 ROD (Excluded from this prohibition is impacted material that has been treated so that it is no longer "characteristically hazardous".);
- material from any off-site source, including any other DOE site, except as provided in the *OU5 ROD*, which states *"Specifically excluded from this prohibition are laboratory wastes generated at off-site facilities resulting directly from the chemical, radiological and engineering analysis of FEMP waste materials/contaminated media or wastes generated at off-site facilities during the conduct of treatability or demonstration type studies on FEMP material";*
- pressurizable gas cylinders;
- process-related metals (OU3-ROD Category C materials);
- product, residues, and other special materials (a subset of OU3-ROD Category J materials);
- materials containing free liquids (The intent of the exclusion of free liquids is to prevent contaminated liquid waste from being directly disposed of in the OSDF (e.g., drum of solvent). Materials that contain rainwater or that have an inherent moisture content like sludges are not excluded from disposal in the OSDF. If a material that arrives at the OSDF for disposal is too wet for proper placement and compaction, the material will be mechanically processed before placement.);
- intact drums (*i.e.*, drums must be empty and crushed);
- acid brick (OU3-ROD Category F materials);
- transformers, which have not been either crushed or had their void spaces filled with grout (or other material approved by the CM);
- whole or shredded scrap tires (as defined by Ohio Environmental Protection Agency);
- used oils; and
- materials not accompanied by the transportation "manifest" information specified in this plan.

5.0 IMPACTED MATERIAL DESCRIPTIONS

5.1 General

The OSDF will be the final repository for a majority of the impacted material from the five operable units of the integrated FEMP remediation. Construction debris (*i.e.*, waste originating during the construction of the OSDF) will also be disposed in the OSDF. The materials requiring OSDF disposal are expected to vary considerably in their composition, handling, placement, and compaction characteristics. Given this variability, it is useful to develop a categorization framework wherein materials with similar characteristics are assigned to the same category. The purpose of this section of the IMP Plan is to describe and categorize the various impacted materials using a common categorization framework.

5.2 Impacted Material Categories

Impacted materials to be disposed in the OSDF shall be assigned to one of five categories, depending on the procedures that will be used to place them into the OSDF:

Category 1 - Category 1 impacted materials are soils and soil-like materials that do not contain hard agglomerations greater than 12 in. (300 mm) in greatest dimension. If the material is other than till or ash, it must also have at least 80 percent of its particles finer than a 1 in. (25 mm) particle size. If this latter criterion is not met, the material should be classified as a Category 2 material. These impacted materials are expected to be readily compactible using standard construction equipment.

Category 2 - Category 2 impacted materials are materials that can be transported, placed, spread, and compacted *en masse*. These materials can be spread in loose lifts of 18 to 21 in. (450 to 530 mm) thick and are moderately compactible under the action of equipment similar to the Caterpillar D-8 bulldozer or 815C compactor. Examples of these materials include broken-up concrete foundations or impacted soil mixed with broken-up concrete. This category also includes general building rubble and debris of irregularly shaped metals or other components of the superstructure or substructure with a maximum length of 10 ft. (3 m) and a maximum thickness of 18 in. (450 mm) which can be transported, placed, spread, and compacted *en masse*.

Category 3 - Category 3 impacted materials are materials that must be individually handled and placed in the OSDF, and that are suitable for having Category 1 material placed around and against them. These impacted materials have maximum cross-sectional dimension of no more than 4 ft. (1.2 m), are shaped such that Category 1 material to be compacted around and against them, and are essentially incompressible using standard compaction equipment. Examples of these

materials include bundles of transite panels, and broken concrete foundation members that meet the physical criteria defined in Section 4.3 of this IMP Plan.

Category 4 - Category 4 impacted materials are high in organic content and/or very compressible. Examples of these materials are municipal solid wastes from the Solid Waste Landfill, and green waste from clearing, stripping, and grubbing operations around the FEMP.

Category 5 - Category 5 impacted materials are materials that require special handling due to their specific nature. Examples of these materials include double-bagged asbestos and sludges.

The categories given above shall be used by the Subcontractor to categorize each load of impacted material to be brought to the OSDF for disposal. The CM will use this categorization in establishing disposal limitations and instructions for each truck load of material destined for the OSDF.

5.3 Specific Impacted Materials

5.3.1 General

This section of the IMP Plan contains background information on the types and approximate quantities of specific impacted materials that may require special handling and/or placement activities. These impacted materials primarily consist of landfill waste, water treatment plant sludge, and demolition debris. The purpose of this section of the IMP Plan is to provide the Subcontractor with a physical description of these specific materials.

5.3.2 Solid Waste Landfill

The Solid Waste Landfill is a rectangular disposal area of approximately 1 acre (0.4 ha) that has been inactive since 1986. A soil cover has been placed over the disposal area. A drainage ditch serving the northwest portion of the former production area is located in the northern portion of the Solid Waste Landfill. The volume of waste material in the landfill is estimated to be approximately 14,400 yd^3 (11,000 m^3).

The operational history of the Solid Waste Landfill is not well documented. It is thought that the landfill was organized with one to five individual waste disposal cells and an evaporation pond which also served as a surface-water management basin. Materials reportedly buried at the Solid Waste Landfill include non-burnable and nonradioactive solid wasted generated on FEMP property, nonradioactive construction-related rubble, and double-bagged and bulk quantities of nonradioactive asbestos. Field investigation results, however, indicate that some process waste may have been placed in the landfill. The following wastes were encountered during a trenching investigation in 1992:

- burnable wastes - bagged trash and wood;

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- potentially burnable wastes - respirator cartridges, asphalt roofing materials, medical wastes, fire hoses, and rubber hoses/belts; and

- non-burnable wastes - unidentified high-activity waste, medicine vials, bagged asbestos, ceramic tiles, possible magnesium fluoride, glass acid bottles, steel cables/cans, paint cans, and copper tubing.

5.3.3 Lime Sludge Ponds

The Lime Sludge Ponds are two unlined, rectangular ponds, each measuring approximately 125 by 225 ft. (38 x 69 m). Wastes that were disposed in the Lime Sludge Ponds originated from water treatment plant operations, coal pile stormwater runoff, and boiler plant blowdown. Although this waste is from three distinct waste streams, the bulk of the slurry is lime sludge from the water treatment process. Over time, the solids in the slurry settled in the Lime Sludge Ponds and the remaining decant was pumped from the ponds. The lime sludge is, therefore, considered to be relatively homogenous.

The volume of sludge and berm material contained within the two lime sludge ponds is estimated to be approximately 16,500 yd^3 (12,500 m^3) of lime sludge and 5,600 yd^3 (4,300 m^3) of berm material making a total of 22,100 yd^3 (17,100 m^3) of material. The South Lime Sludge Pond is full and has been inactive since the mid-1960's; it is now overgrown with grasses and shrubs. The North Lime Sludge Pond is not currently active, but was in use as late as January 1995. The west side of the North Lime Sludge Pond is usually covered with 1 to 2 ft. (0.3 to 0.6 m) of water, depending mainly on precipitation. The remaining area is dry and covered with sparse vegetation.

5.3.4 Building Debris

Debris from demolition of buildings in the FEMP former production area is expected to constitute the largest volume of impacted material for OSDF disposal after soil and soil-like material. The OU3 ROD indicates that impacted debris can be assigned to one of ten material categories. The OU3 ROD indicates that material from seven of these categories will be disposed in the OSDF; material from three other categories (C, F, and J) are to be dispositioned off-site (*i.e.*, expressly prohibited in total from on-site disposal), while a subset of a third category (D) cannot be disposed in the OSDF without first undergoing treatment (lead flashing). Description of the seven OU3 debris material categories resulting from decontamination and dismantlement of the former production and associated process facilities that can be disposed of in the OSDF are defined in Table 5-1.

5.3.5 Inactive Flyash Pile

The Inactive Flyash Pile is located approximately 2000 ft. (610 m) southwest of the former production area. The Inactive Flyash Pile received flyash and bottom ash from boiler plant operations starting in 1951. It has been inactive since the mid-1960s and is covered with soil and natural vegetation. The total quantity of ash disposed in this area has been estimated at 43,600 yd^3 (33,300 m^3). Materials such as building rubble, concrete, asphalt, steel rebar, and asbestos containing transite were also discard-

Table 5-1
OU3 Material Categories/Descriptions

Category A Accessible Metals	Category B Inaccessible Metals	Category D Painted Light-Gauge Metals	Category E Concrete	Category G Non-Regulated ACM	Category H Regulated ACM	Category I Miscellaneous Materials
Structural & miscellaneous steel	•Doors •Conduit/wire/ cable tray •Electrical wiring & fixtures •Electrical transformers •Miscellaneous electrical items •HVAC equipment •Material handling equipment •Process equipment •Miscellaneous equipment •Piping	•Ductwork •Louvers •Metal wall & roof panels	•Asphalt •Slabs •Columns •Beams •Foundations •Walls •Masonry •Clay piping	•Ceiling demolition •Feeder cable •Fire brick •Floor tile •Transite wall & roof panels	•Ductwork insulation •Piping insulation •Personal protective equipment •Copper scrap metal pile	•PVC conduit •Basin liners •Fabric •Drywall •Building insulation •Miscellaneous debris •Personal protective equipment •PVC piping •Roofing build-up •Process trailers •Non-process trailers •Windows •Wood

SOURCE: Table 4-2, OU3 Material Categories/Description, *OU3 ROD* [DOE, 1996b].
NOTE: Only those OU3 material categories allowed for on-site disposal per the *OU3 ROD* are presented.

ed in this area. These materials are visible at the surface along the Inactive Flyash Pile's western and southern edge.

5.3.6 South Field

The South Field disposal area is located approximately 2000 ft. (610 m) southwest of the former Production Area and covers approximately 11 ac (4.5 ha). The South Field was used as a burial site for construction rubble and as a disposal area for soil excavated from the former Production Area. Disposal activity ceased during the mid 1960s. Soil, building rubble, concrete, asphalt, flyash, and steel rebar were encountered during sampling operations within the soil fill in the South Field. The estimated volume of fill disposed in the South Field is approximately 120,000 yd^3 (91,800 m^3).

5.3.7 Active Flyash Pile

The Active Flyash Pile disposal area is located about 3000 ft. (914 m) southwest of the former Production Area and east of the South Field. Past operations at the FEMP have relied on boiler-produced steam. Ash waste is comprised primarily (70 percent) of bottom ash collected below the boilers. Precipitator ash collected from pollution control devices and flyash removed from the middle levels of the boiler comprise the remaining 30 percent of the ash waste. Until recently, ash waste has been loaded into dump trucks and transported to the Active Flyash Pile disposal area. Estimates established indicate that approximately 65,000 yd^3 (49,700 m^3) of ash have been disposed in this area. The pile has a surface area of approximately 4 ac (1.6 ha).

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6.0 GENERAL PLACEMENT PROCEDURES

6.1 Introduction

This section of the IMP Plan describes the general procedures that the Subcontractor shall follow for placement of impacted material in the OSDF. Specific procedures for placement of Category 1 materials (soil and soil-like) are presented in Section 7.0 of this IMP Plan. Specific placement procedures for Category 2 through 5 materials (non soil-like materials) are addressed in Section 8.0 of this IMP Plan.

6.2 Manifesting

The remediation project originating the impacted material shall prepare an impacted material transportation "manifest" for each load of material to be transported to the OSDF. The purpose of the "manifest" is to provide a tracking mechanism for impacted material from the remediation project of origin to placement in the OSDF. The originating remediation project shall be responsible for providing the following information on the "manifest":

- originating remediation project (the operable unit and project);
- brief description of the impacted material in the load;
- classification of the impacted material into one of the five material categories of this IMP Plan; and
- documentation that the material meets the criteria in Section 4.0 of this IMP Plan.

The CQC Consultant shall be responsible for recording on the "manifest":

- the OSDF cell identifier where the material is placed.

The Subcontractor shall develop a system acceptable to the CM for identifying the category of impacted material being hauled. This system shall indicate the category of material in the truck (or container as appropriate) and whether the truck/container is carrying special items such as asbestos, extremely heavy items, extremely compressible items, impacted materials requiring special dust mitigation procedures, sludge, or landfill waste.

At the OSDF battery limit, each truck load (or container, as appropriate) of impacted material will be monitored by the CQC Consultant in accordance with Appendix A of this plan. The monitoring will include monitoring for asbestos, visual verification that the impacted material matches the description on the manifest, visual checking that the material meets the OSDF physical criteria, and visual checking that prohibited items are not included in the load. The CQC Consultant will be required to sign the "manifest" and retain a copy. The Subcontractor shall fully comply with these quality control activities and account for them in its planning and scheduling.

After trucks/containers are cleared at the OSDF battery limit, the Subcontractor shall route the impacted material to a location within the OSDF (*e.g.*, the active face, a stockpile area, or an area where further screening will take place) for disposal. The Subcontractor will be provided with flexibility in routing trucks/containers for efficient operations. However, the CM will provide the Subcontractor with specific instructions for routing of impacted materials in Categories 2 through 5. The Subcontractor shall be responsible for following these instructions.

The placement and compaction procedure to be used by the Subcontractor for each load of impacted material shall be based on the impacted material category. Placement and compaction procedures for the five material categories listed in Section 5.2 of this IMP Plan are presented in Sections 7.0 and 8.0 of this plan.

6.3 Protection of Facilities

Impacted material placement activities shall be conducted in a manner that protects and maintains the integrity of the OSDF liner system, leachate management system, and final cover system, and all OSDF ancillary facilities and equipment. Impacted material placement activities shall not commence in a cell until liner system construction has been completed in accordance with the contract documents and only after cell construction has been certified in accordance with the requirements of the *OSDF CQA Plan* and all other subcontract requirements.

6.4 Placement Oversight and Quality Assurance

Impacted material placement for all categories of material shall be conducted under the direct oversight of Subcontractor personnel versed in all aspects of this plan and having qualifications meeting the requirements of the *OSDF CQA Plan*. The Subcontractor shall provide on-the-ground spotters who shall observe each load that is placed to monitor that the work is performed in compliance with the requirements of this plan. The Subcontractor shall be assisted by surveyors and quality control personnel, as required, to control lift thickness and grades, record the coordinates of the impacted material placement, and perform other necessary functions.

The Subcontractor shall be aware that monitoring of the placement and monitoring and testing of impacted material for specified compaction in the OSDF will be performed by the CQC Consultant in accordance with the requirements of the contract documents.

6.5 Conformance with OSDF Specifications

The Subcontractor shall comply with the project specifications, which shall be used in conjunction with this plan, and these shall be referenced for specific details regarding the labor, material, and supervision at the OSDF.

6.6 Standard Operations Procedures

6.6.1 General

The CM will have the authority to halt impacted material placement operations if placement operations are not in accordance with the project specifications and this IMP Plan.

Salvaging of materials being deposited in the OSDF is strictly prohibited. Fluor Daniel Fernald (FDF) personnel will examine, on a random basis, trucks leaving the OSDF for salvaged materials.

Placement of impacted materials shall only occur during daylight hours unless specifically approved by the CM. The last unit load of waste typically will not be accepted less than 45 minutes prior to sundown.

Impacted material placement activities shall cease for the winter when the CM determines that satisfactory compaction of impacted material and/or safe working conditions are no longer possible due to weather conditions.

6.6.2 Inclement Weather Operations

Placement of impacted material in the OSDF shall cease when the average wind speed measured at or near the working face of the active OSDF cell is in excess of 20 mph (33 kph) or when wind gusts exceed 30 mph (50 kph) for more than 1 minute in the previous 60 minutes. The CQC Consultant or FDF will provide and maintain a weather station at or near the active working face of the OSDF to provide a continuous record of wind speed and temperature during the working day; the station will also be equipped with a rain gauge. The CM will determine when unacceptable wind conditions exist.

Impacted material shall not be placed during periods of significant precipitation. Significant precipitation will be determined by the CM in consultation with the CQC Consultant.

The Subcontractor may prepare an inclement weather deck within the OSDF active cell. The purpose of this deck is to provide an area where placement activities can occur when precipitation has left other areas of the OSDF unsuitable (due to mud or soft surfaces) for impacted materials placement activities. The inclement weather deck may be used for placement of Category 2 materials (*en masse* placement).

Impacted material placement activities shall not restart after an inclement weather shutdown until verbal approval to do so is provided by the CM. Factors that will be considered by the CM in restarting operations include:

- weather forecasts;
- condition of haul roads;
- if operations could lead to additional erosion of impacted materials;

- ability to decontaminate the impacted material hauling trucks;
- nature of impacted materials to be placed; and
- conditions within the OSDF.

6.6.3 As-Placed Plans

The Subcontractor shall be aware that the CQC Consultant will maintain plans showing the locations of placement of all categories of impacted materials. The plans will provide the OSDF cell, grid and lift alphanumeric identifier for each load of Category 2 through 5 material placed in the OSDF (referenced to the load manifest number), the category of material in the load, and other information. The CM (this person is responsible for contractual purposes; see next paragraph for actual operations) will use these plans to decide where subsequent loads of Category 2 through 5 waste can be placed. For example, the Subcontractor will not be allowed to compact multiple lifts of Category 4 (organic) impacted material on top of each other so as to avoid creating a compressible zone in the OSDF that could induce future differential settlements in the OSDF final cover system.

As an example, if a load of double-bagged asbestos comes to the OSDF for disposal, the construction engineer will first consult the as-placed plans to determine a suitable place to dig a trench for disposal (as required by Section 8.6.3 of this Plan). Consultation of the as-placed plans will ensure that placement restrictions are followed and that the trench for asbestos disposal will not be excavated into anything except Category 1 material. Following identification of a suitable location, the trench will be excavated, the double-bagged asbestos placed, and the trench backfilled and compacted according to requirements. The construction engineer will then note the location (grid and elevation), depth, and length of the trench on the as-placed plans.

6.7 Spreading and Grading

The Subcontractor shall be aware that an important objective of this IMP Plan is to achieve uniform settlement of the impacted materials placed within the OSDF and to limit the total magnitude of such settlement. Thus, the Subcontractor shall, as much as possible, maintain homogeneity of the physical characteristics of the impacted materials placed across horizons of the OSDF. The Subcontractor will be directed by the CM to route impacted materials in such a fashion that each lift is relatively uniform over its lateral extent. To the extent possible, compressible materials (such as green wastes, double bagged asbestos, and Solid Waste Landfill materials) shall not be piled vertically but shall be spread laterally (except for double bagged asbestos, which shall be handled in accordance with Section 8.6.3). Incompressible materials shall not be placed directly above other incompressible items without appropriate intervening lifts of Category 1 materials. Materials of higher permeability (such as demolition debris) shall not be placed directly above other high permeability materials without appropriate intervening lifts of lower permeability materials.

Impacted material placement shall generally proceed from east to west and north to south within each OSDF cell. Maximum compacted lift thicknesses for soil, soil-like-materials, and other impacted materials shall be 1.0 ft. (0.3 m), except as provided in Section 8.0 of this IMP Plan. Each lift of

topmost select impacted material shall be controlled to line and grade such that cell perimeter contours are within 0.2 ft. (60 mm) of the design grade for the bottom of the contouring layer.

Figure 6-1 illustrates the sequencing of impacted material placement and slope development within the first OSDF cell, looking west to east. Select impacted material layers on the cell base and sideslopes shall be advanced at least 2 ft. (0.6 m) ahead of general impacted material layers. Similarly, Figure 6-2 illustrates the sequencing of impacted material placement and slope development in subsequent cells.

6.8 Compaction

Each lift of Category 1 impacted material placed in the OSDF shall be compacted by the Subcontractor to the minimum criteria given in Sections 7.0 and 8.0 of this IMP Plan. Monitoring and testing activities are described in Appendix A of this IMP Plan.

6.9 Daily Surface Conditions and Drainage

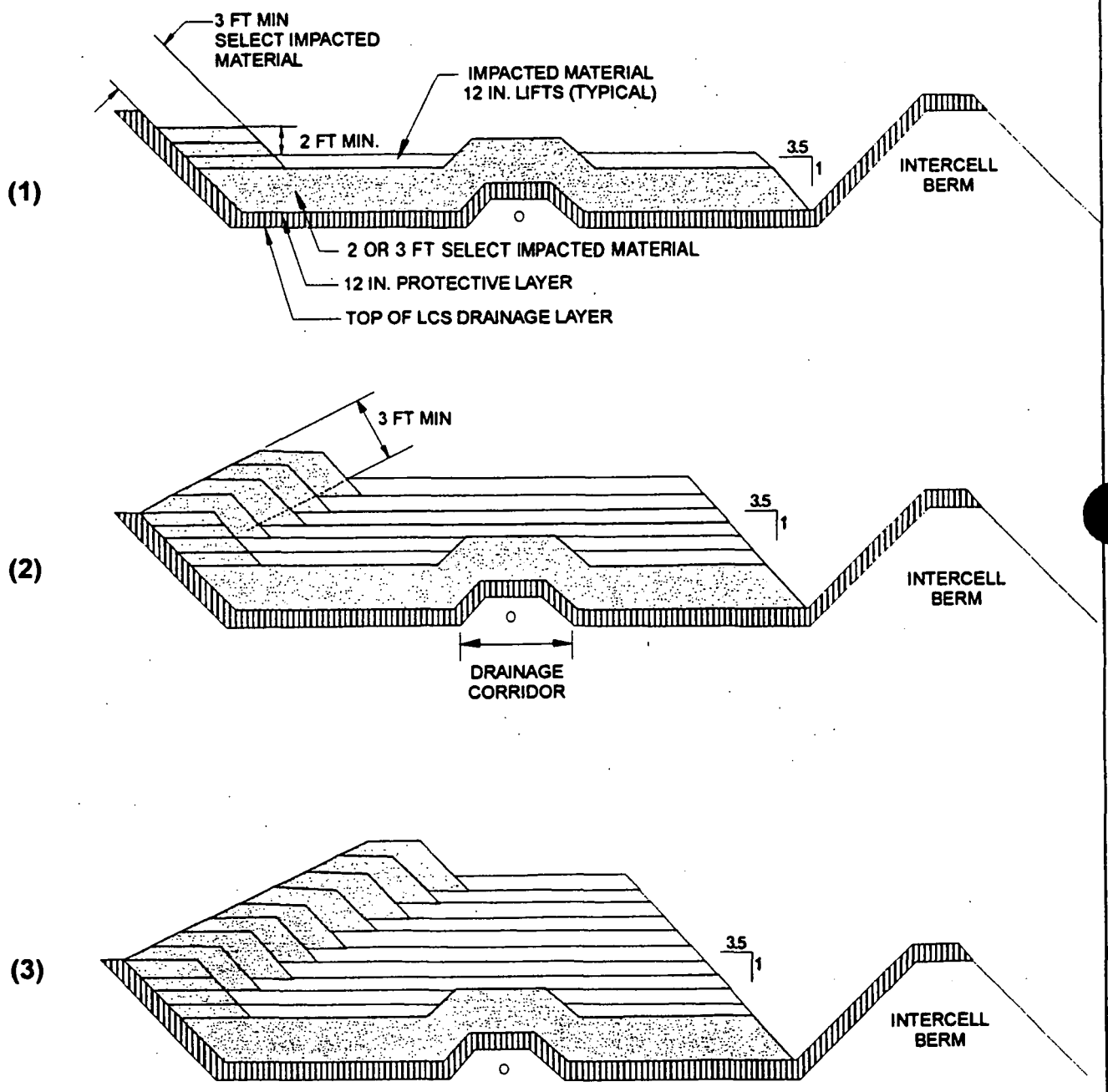
On a daily basis, the Subcontractor shall maintain the impacted material surface in active OSDF cells to limit fugitive dust and control and detain impacted runoff. The Subcontractor shall establish stormwater runoff routing in each active cell to convey runoff to the impacted runoff catchment area within the cell. The Subcontractor shall use smooth rolling to seal the surface, silt fences, and other means to limit impacted material erosion. At the end of each working day, the uppermost layer of impacted material shall be sloped at a minimum grade of 2 percent to the south. The southern impacted material face shall be constructed to a slope not steeper than 3.5H:1V (horizontal:vertical). The Subcontractor shall perform temporary erosion control requirements in accordance with the *OSDF SWMEC Plan*.

At the end of each working day, the Subcontractor shall prepare exposed impacted material surfaces in a manner that satisfactorily controls the generation of fugitive dust. Preparation may include smooth rolling to seal the surface, application of water, application of crusting agents, or covering with geosynthetics. Fugitive dust control actions shall be sufficient to achieve compliance with the BAT determination for remedial construction activities on the FEMP site. At all times, the Subcontractor shall be prepared to implement the measures mentioned in this paragraph to reduce fugitive dust based on the Subcontractor's approved fugitive dust plan or as directed by the CM.

The final daily lift on areas of active impacted material placement shall consist of a 12 in. (300 mm) thick soil (Category 1 material) layer spread and compacted as described in Section 7.0 for Category 1 material placement. The final compaction pass of this layer shall be made using a smooth-drum roller to seal the surface against excessive infiltration and to control fugitive dust. Smooth-rolled surfaces shall be disked, tracked, or otherwise broken up prior to placement of subsequent lifts.

Impacted material slopes shall be protected from excessive material erosion through the use of silt fences spaced at a maximum vertical spacing of 10 ft. (3 m) as shown in Figure 6-3. The base of the slope of impacted material, along the perimeter of the impacted runoff catchment area in the cell shall be lined with straw bales to limit the washing of fines into the cell impacted runoff detention area. The

IMPACTED MATERIAL PLACEMENT SEQUENCE - CELL1

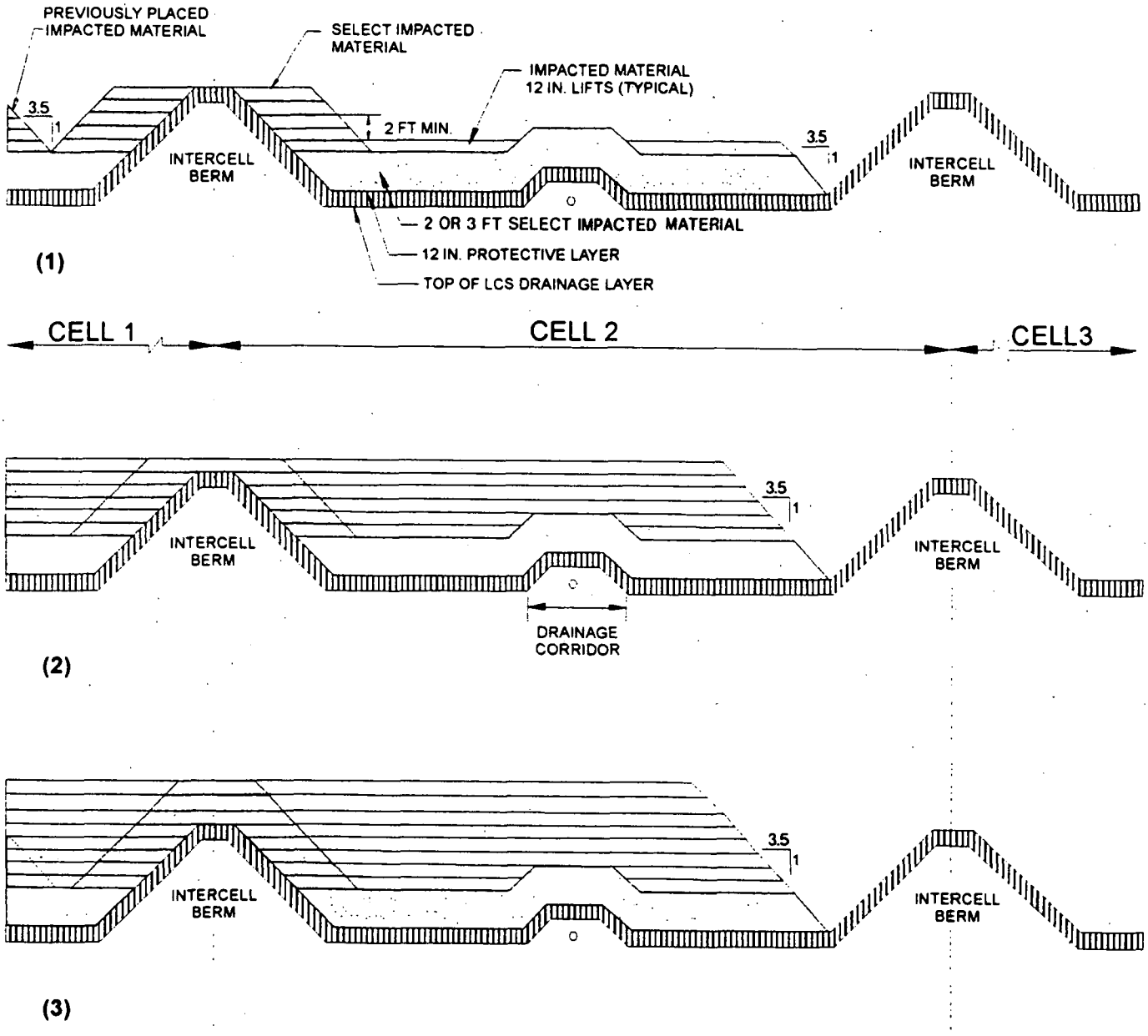


NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. SUBCONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS.

GeoSyntec Consultants
ATLANTA, GEORGIA

FIGURE NO.	6-1
PROJECT NO.	GQ0166-06
DOCUMENT NO.	F9620002.CDI
FILE NO.	FIG-6-1.CDR

IMPACTED MATERIAL PLACEMENT SEQUENCE - INTERIOR CELLS

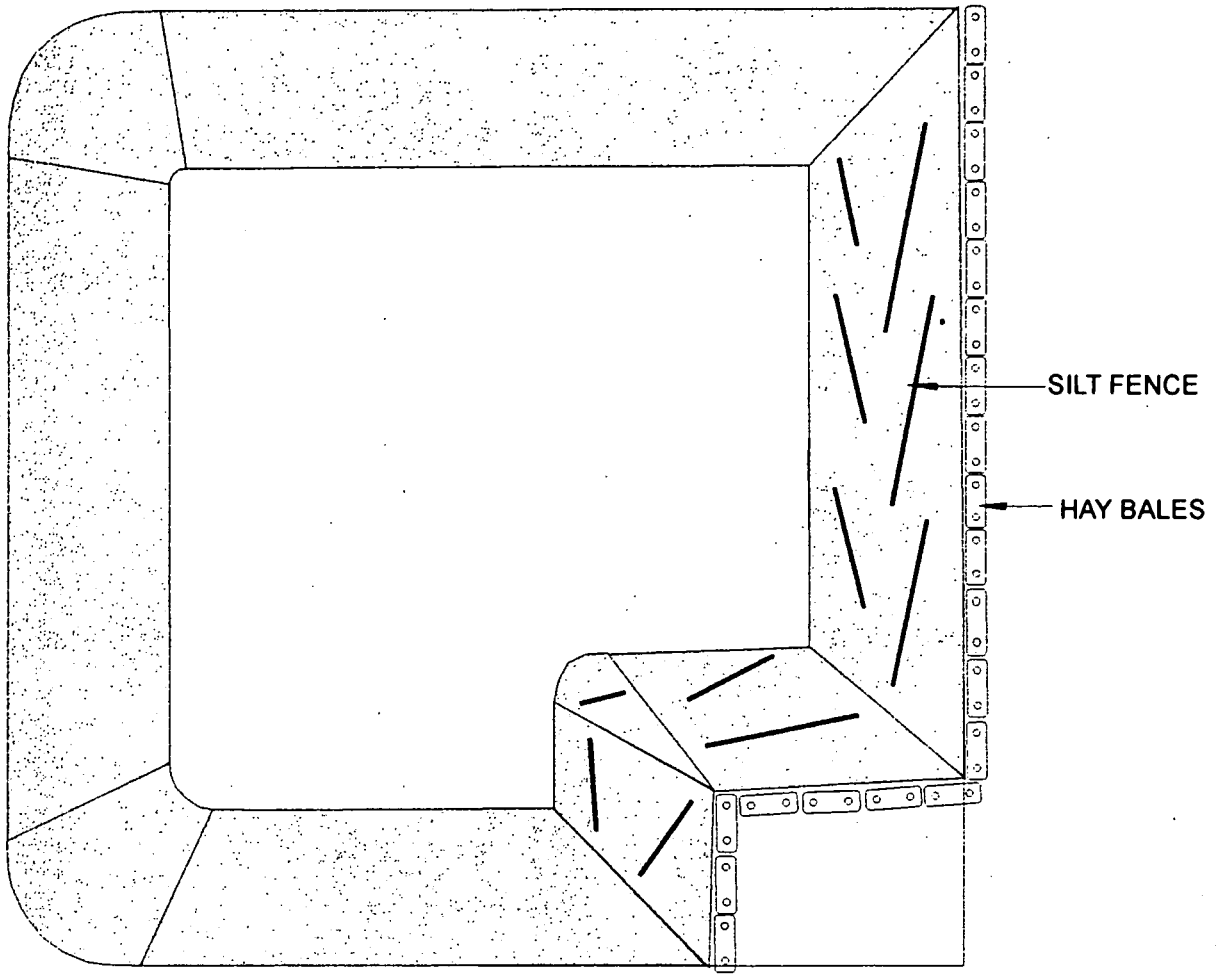


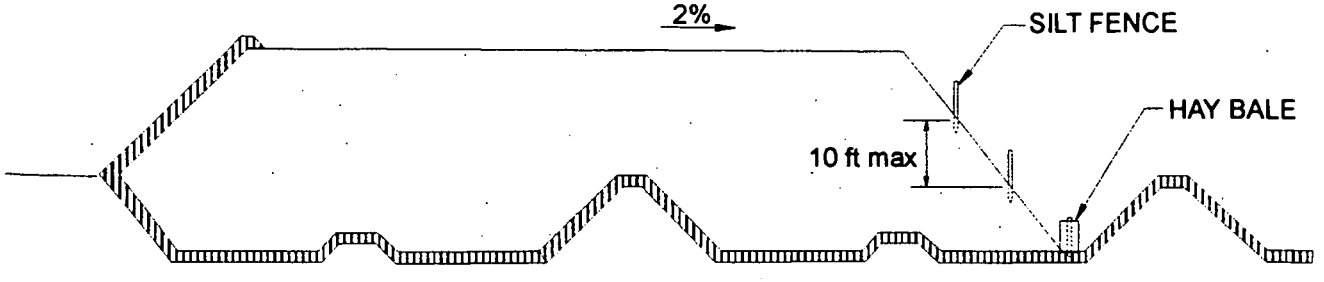
NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. SUBCONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS.

GeoSyntec Consultants
ATLANTA, GEORGIA

FIGURE NO.	6-2
PROJECT NO.	GQ0166-06
DOCUMENT NO.	F9620002.CDI
FILE NO.	FIG-6-1.CDR

IMPACTED MATERIAL
EROSION PROTECTION AND SEDIMENT CONTROL





NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. SUBCONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS.

GeoSyntec Consultants
ATLANTA, GEORGIA

FIGURE NO.	6-3
PROJECT NO.	GE3900-10.2
DOCUMENT NO.	F9620002.CDC
FILE NO.	FIG-6-3.CDR

impacted runoff catchment area at the southwest corner of each cell has been sized to provide adequate capacity for the detention of the impacted runoff from the 25-year, 24-hour storm event, with 6 in. (150 mm) of freeboard. The catchment area in a current active cell shall be fully maintained until the next active cell becomes operational and the Subcontractor has routed all impacted runoff from the current active cell such that impacted runoff from the 25-year, 24-hour storm event will always be contained within the cells.

Runoff in the impacted runoff catchment area may be pumped into the FEMP former production area stormwater management system or be allowed to percolate through the granular protection layer into the underlying cell leachate collection system. Requirements for maintaining unimpeded infiltration from the impacted runoff catchment area into the leachate collection system are given in the *OSDF Systems Plan*.

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7.0 SOILS AND SOIL-LIKE MATERIAL PLACEMENT

7.1 General

Approximately 85 percent of the impacted material volume to be placed in the OSDF will be Category 1 material (soil and soil-like). Category 1 material may be further divided into: (i) protective and contouring layer soils; (ii) select impacted material layer soils; and (iii) general soil and soil-like material. The placement of this material is expected to be accomplished using similar methods for spreading, grading, and compaction associated with earthwork for OSDF construction. This section of the IMP Plan addresses those activities associated with the placement and compaction of these soils and soil-like Category 1 materials within the OSDF.

7.2 Protective and Contouring Layers

7.2.1 Placement Procedures

As indicated in Section 3.2 of this IMP Plan, the protective and contouring layers shall consist of on-site impacted till or flyash having a maximum particle size not exceeding 3 in. (75 mm) (ASTM C 136). The protective and contouring layers shall also meet the requirements of the construction specifications. Topsoil shall not be used for either the protective or contouring layers.

The protective layer shall be placed in a 12 to 15 in. (300 to 380 mm) thick loose lift. The contouring layer shall be placed in two loose lifts, each between 6 to 8 in. (150 to 200 mm) thick.

7.2.2 Compaction Procedures

To protect the underlying liner system from construction-induced damage, the protective layer shall not be compacted with conventional compaction equipment but rather shall be tracked with a medium-sized bulldozer such as a Caterpillar D-5 (or lighter). The protective layer shall be constructed in conformance with the construction specifications.

The contouring layer shall be compacted to at least 95 percent of the standard Proctor dry density (ASTM D 698). A standard Proctor maximum dry density and optimum moisture content will be established by the CQC Consultant for Category 1 impacted material used in the contouring layer. These materials types will be composited prior to establishing these parameters. These parameters will be obtained by the CQC Consultant in an on-site geotechnical laboratory established for OSDF construction. Each lift of the contouring layer shall be compacted by multiple passes of a self-propelled static pad-foot compactor (*i.e.*, a Caterpillar 815C, or equivalent). It is anticipated that the required compaction moisture content will be within ± 3 percentage points of the material's optimum moisture content. Specific requirements for compaction moisture content will be established by the CM during construction. The contouring layer shall be constructed in conformance with the construction specifications.

7.3 Select Impacted Material Layers

7.3.1 Placement Procedures

As indicated in Section 3.2 of this IMP Plan, select impacted material shall have a maximum particle size not exceeding 6 in. (150 mm) (ASTM C 136); for material other than impacted till, at least 80 percent of the material shall be finer than a 1 in. (25 mm) particle size. Impacted topsoil may be included in the select impacted material layer but it should not be placed in quantities that deleteriously affect compaction.

The select impacted material layer at the base of the landfill shall be placed in 12 to 15 in. (300 to 380 mm) thick loose lifts and compacted to a minimum total thickness of 3 ft. (0.9 m) (*i.e.*, three lifts of roughly equal thickness). The thickness of select impacted material over the protective layer may be decreased to 2 ft. (0.6 m) if the first lift to be placed over the select impacted material is either Category 1 or Category 2 impacted materials. The select impacted material layer below the final cover system shall be placed in a similar manner to a minimum total thickness of 3 ft. (0.9 m) measured perpendicular to the exterior slope (see Figure 6-1).

7.3.2 Compaction Procedures

A standard Proctor (ASTM D 698) maximum dry density and optimum moisture content will be established for impacted material used in the select impacted material layers. These material types will be composited prior to establishing these parameters. These parameters will be obtained by the CQC Consultant in an on-site geotechnical laboratory established for OSDF construction. Each lift of select impacted material shall be compacted to 85 percent of the standard Proctor maximum dry density if adjacent to the protective layer and to 90 percent of the standard Proctor maximum dry density if adjacent to the contouring layer. It is anticipated that the compaction moisture content will be within ± 3 percentage points of the optimum moisture content. Specific requirements for compaction moisture content will be established by the CM during construction.

7.4 General Soil and Soil-Like Material

7.4.1 Placement Procedures

Category 1 (soil and soil-like) material shall be placed in 12 to 15 in. (300 to 380 mm) thick loose lifts and then compacted as indicated below. Prior to placement of a new lift of Category 1 material, the previous lift shall be disked or tracked to leave the surface in a rough condition. The purpose of this preparation is to promote adhesion of the previous and new lifts and to mitigate preferential seepage pathways forming between adjacent lifts.

7.4.2 Compaction Procedures

Category 1 (soil and soil-like) material shall be compacted to at least 85 percent compaction based on the standard Proctor compaction test, with a running average of at least 90 percent based on the previous 10 samples. The CQC Consultant will establish the standard Proctor maximum dry density

(ASTM D 698) and optimum moisture content for Category 1 material requiring compaction. These materials will be composited prior to establishing these parameters. These parameters will be obtained by the CQC Consultant in an on-site geotechnical laboratory established for OSDF construction. It is anticipated that the compaction moisture content of the Category 1 material will be within ± 3 percentage points of the material's optimum moisture content. Specific requirements for compaction moisture content will be established by the CM during construction. These requirements will take into account the workability of the material, the required shear strength to obtain adequate levels of OSDF stability, moisture contents needed to achieve dust and other fugitive dust control, and material trafficability.

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8.0 SPECIAL PLACEMENT REQUIREMENTS

8.1 Introduction

This IMP Plan requires special procedures for the placement of the non-soil-like materials (Categories 2 through 5). The non-soil-like materials consist primarily of impacted materials from the Solid Waste Landfill, the Lime Sludge Ponds, and impacted debris resulting from demolition of structures within the FEMP former production area. The impacted debris consists primarily of building superstructure (*i.e.*, steel, masonry, transite, and other finish components), concrete floor slabs, and building substructure (*i.e.*, concrete footings, pads, and other components).

8.2 Location Recording and Surveying

The Subcontractor shall identify the locations of placement of each zone or horizon of Categories 2 through 5 impacted material as it is placed in the OSDF. For each zone or horizon or other placement unit, the Subcontractor shall establish the horizontal location within 100 ft. (30 m) gridlines and the vertical location by lift. The Subcontractor shall survey the surface of impacted material compacted in place on a 100 ft. by 100 ft. (30 m by 30 m) grid after each week's placement activities. This survey will locate the grid corners to facilitate testing and record keeping. The coordinates used for this survey shall be with respect to the permanent coordinate system established for the OSDF. Where appropriate, sketches of disposal of Category 3 through 5 materials should be provided to show the general orientation and layout of individual and special items.

The Subcontractor shall maintain the grid markers around the perimeter of the cell(s) receiving impacted material. These grid markers are to be placed to a 1 ft. horizontal tolerance.

8.3 Category 2 Material (*En Masse* Placement)

8.3.1 Placement Procedures

Materials conforming to the Category 2 (*en masse* placement) definition shall be placed in the OSDF in loose lifts not exceeding 21 in. (530 mm) in thickness. Prior to placement of a lift of Category 2 material, the placement unit shall be designated such that the unit can be isolated horizontally on all sides with a minimum of 10 ft. (3 m) of Category 1 material. Category 2 material shall then be placed within the designated placement unit to a loose thickness of not more than 21 in. (530 mm). Initial compaction shall be accomplished as the material is spread by tracking with a bulldozer of a minimum total weight of 50,000 lbs (220 kN) producing a ground pressure of at least 10 psi (70 kPa). After spreading and initial compaction, Category 1 material (of a granular nature when available) shall be spread over the Category 2 material to bring the layer thickness to approximately 24 in. (610 mm). Prior to placement of a second lift of Category 2 material, Category 1 material shall be constructed at the perimeter of Category 2 material to the height of the Category 2 material and to a width of approximately 10 ft (3 m).

As Category 2 material is expected to be less compressible than the majority of the materials contained in the OSDF, the material should be spread laterally prior to placing the material vertically above other Category 2 material. However, as it is also expected to be more permeable than other OSDF material, Category 2 material shall not be spread laterally more than 100 ft. (30 m). In all cases, Category 2 material is to be surrounded in the horizontal directions by at least 10 ft. (3 m) of less permeable Category 1 material. This will reduce the potential for significant lateral migration of leachate. Not more than one lift of Category 2 material shall be placed on top of another lift of Category 2 material without a minimum 4 ft. (1.2 m) thick intervening horizon of Category 1 material.

The Subcontractor should mix Category 1 material as much as practicable with the Category 2 material during excavation and placement activities. The objective of this mixing is to fill voids within the Category 2 material, increase the density of the material placed in the OSDF, and aid in the homogenizing of building rubble, demolition debris, and soils.

8.3.2 Compaction Procedures

After each lift of Category 2 material is placed, the material shall be compacted by four passes of a self-propelled, static pad-foot compactor (*e.g.*, Caterpillar 815C, or equivalent). Soil (Category 1 material) spread on top of the Category 2 material shall be compacted to at least 90 percent of the standard Proctor dry density determined as described in Section 7.4.2 of this IMP Plan. It is anticipated that the soil compaction moisture content will be within ± 3 percentage points of the material's optimum moisture content. Specific requirements for compaction moisture content will be established by the CM during construction. These requirements will take into account the workability of the soil, the required soil shear strength to obtain adequate levels of OSDF stability, moisture contents needed to achieve dust and other fugitive dust control, and material trafficability. After compacting the Category 1 material over the Category 2 material, the Category 1 material shall be proof rolled. Soft spots indicated by tire ruts more than 2 in. (50 mm) in depth or visible deflection under the moving proof rolling equipment shall be stabilized through additional passes of the compactor. The proof rolling equipment shall have a minimum gross vehicle weight of 20 tons (180 kN) and exert a ground pressure of at least 65 psi (450 kPa). Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the CM. This treatment shall consist of removal, replacement, and recompaction of the soil material, and, if needed, infilling soft spots/areas in the Category 2 material with grout or other material approved by the CM.

8.4 Category 3 Items (Individual Items)

8.4.1 Placement Procedures

Items not more than 4 ft. (1.2 m) in maximum cross-sectional dimension and of regular geometry can be placed as individual members or packages in the OSDF. As much as possible, groups of individual members or packages shall be similarly and regularly sized to enable their placement in the OSDF in regular patterns. Items shall be placed at least 8 ft. (2.4 m) apart. Figure 8-1 illustrates the placement of several bundles of packaged transite panels.

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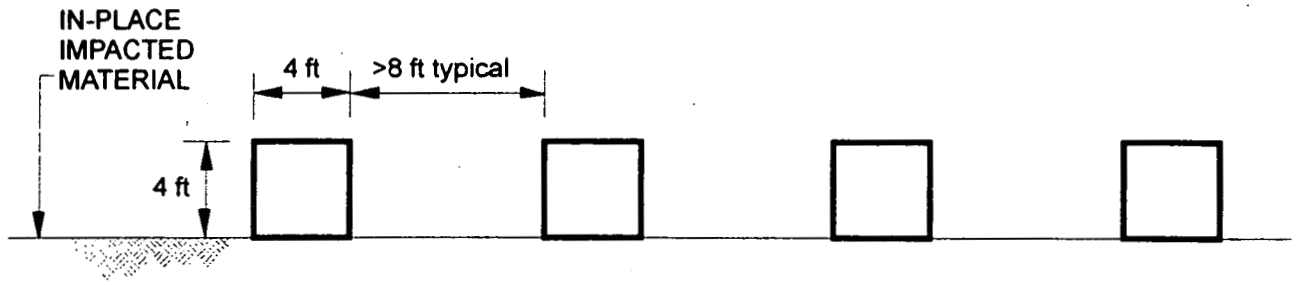
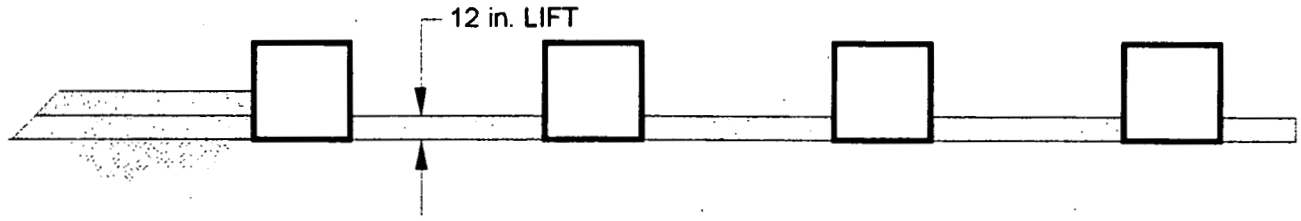
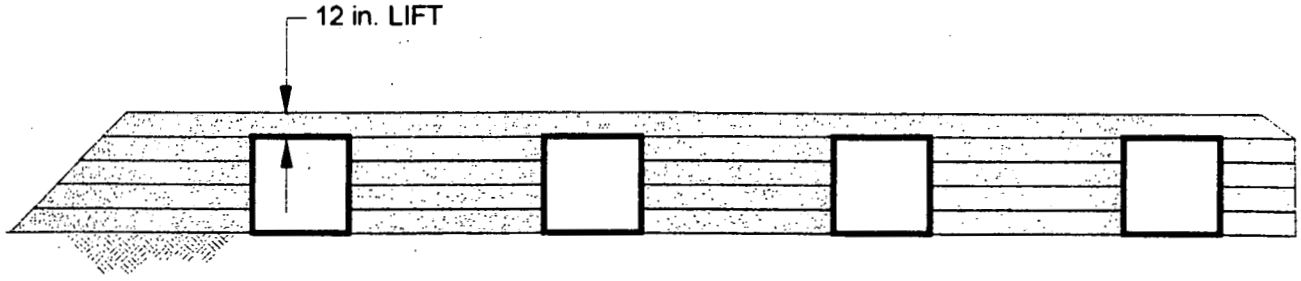
CATEGORY 3 MATERIAL PLACEMENT SEQUENCE



1. PLACED IN A REGULAR PATTERN



2. SPACE FILLED WITH 12 in. LIFTS



3. FINAL 12 in. LIFT PLACED ABOVE GROUPS

NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. SUBCONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS.

GeoSyntec Consultants
ATLANTA, GEORGIA

FIGURE NO.	8-1
PROJECT NO.	GE3900-10.2
DOCUMENT NO.	F9620002.CDC
FILE NO.	FIG-6-3.CDR

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Items having voids with a volume larger than 1 ft^3 (0.03 m^3) shall be filled with a quick-set grout, or flowable cohesionless material approved by the CM. If a grout is used in this manner, it shall be allowed to set for a minimum of 4 hours prior to the commencement of placement of fill around the item.

Prior to placement of the Category 3 items, the surface of the in-place Category 1 impacted material shall be prepared by rolling with a smooth-drum roller in the area of item placement. The Category 3 items or packages shall be placed on the surface in a regular pattern with an adequate spacing between individual members or packages to allow Category 1 material placement and compaction with available equipment. The space between each member or package shall be filled with Category 1 material placed in maximum 12 in. (300 mm) thick compacted lifts. A final 12 in. (300 mm) thick compacted lift of Category 1 material shall be placed over each grouping of Category 3 items.

As the Category 3 materials are expected to be less compressible than the majority of the impacted materials placed in the OSDF, the Category 3 items should be placed toward the center of the a cell and not in the same horizon with more compressible materials (*i.e.*, Category 4 materials, and sludges and double-bagged asbestos of Category 5 materials). Horizons of Category 3 materials shall be separated by at least a 4 ft. (1.2 m) thick intervening horizon of Category 1 material.

8.4.2 Compaction Procedures

Each lift of soil (Category 1 material) between and above the Category 3 items shall be compacted using equipment capable of achieving compaction to at least 90 percent of the standard Proctor dry density, determined as described in Section 7.4.2 of this IMP Plan. It is anticipated that the compaction moisture content for this Category 1 material will be within ± 3 percentage points of the material's optimum moisture content. Specific requirements for compaction moisture content will be established by the CM during construction. These requirements will take into account the workability of the soil, the required soil shear strength to obtain adequate levels of OSDF stability, moisture contents needed to achieve dust and other fugitive dust control, and material trafficability.

A final 12-in. (300-mm) thick compacted lift of soil (Category 1 material) shall be placed above the Category 3 material. This final compacted lift shall be proof-rolled using equipment with a minimum gross vehicle weight of 20 tons (180 kN) and exert a ground pressure of at least 65 psi (450 kPa). Soft spots indicated by tire ruts more than 2 in. (50 mm) in depth or visible deflection under the moving proof rolling equipment shall be stabilized through additional passes of the compactor. Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the CM. This treatment shall consist of removal, replacement, and recompaction of the soil (Category 1 material), and, if needed, infilling soft spots/areas around the Category 3 material with grout or other material approved by the CM.

8.5 Category 4 Materials (Highly Compressible)

8.5.1 Placement Procedures

Soil (Category 1 material) berms which are a minimum of 12 in. (300 mm) high shall be placed around Category 4 material. The lateral extent of each Category 4 material placement shall not exceed

100 ft. (30 m). Category 4 material shall be placed adjacent to the berms to a loose thickness of approximately 18 in. (450 mm). Green waste shall be reduced in size, as necessary, to enable placement in the lift. Initial compaction shall be accomplished as the material is spread by tracking with a bulldozer of a minimum total weight of 50,000 lbs (220 kN) producing a ground pressure of at least 10 psi (70 kPa). Prior to placement of the succeeding lifts of Category 4 material, a minimum 12 in. (300 mm) thick loose lift of soil (Category 1 material) shall be placed over the Category 4 material and compacted as indicated below. Compaction of the second lift of Category 4 materials shall be identical to the first lift. Not more than two lifts of Category 4 material shall be placed in a horizon. Category 4 horizons shall not be in the same vertical plane as previously placed Category 4 horizons.

8.5.2 Compaction Procedures

After spreading and initial compaction, the Category 4 material shall be compacted by minimum of four passes of a self-propelled, static pad-foot compactor having a nominal weight of at least 45,000 pounds (*e.g.*, Caterpillar 815C, or equivalent). After each sequence of Category 4 material compaction and covering soil (Category 1 material) placement, the cover soil shall be compacted as required for the soil cover of Category 2 material. The soil cover shall then be proof-rolled. The proof rolling equipment shall have a minimum gross vehicle weight of 20 tons (180 kN) and exert a ground pressure of at least 65 psi (450 kPa). Soft spots indicated by tire ruts more than 2 in. (50 mm) in depth or visible deflection under the moving proof rolling equipment shall be stabilized through additional passes of the compactor. Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the CM. This treatment shall consist of removal, replacement, and recompaction of the soil (Category 1 material), and, if needed, infilling soft spots/areas in the Category 4 material with grout or other material approved by the CM.

8.6 Category 5 Materials (Special Handling, Placement and Compaction)

8.6.1 Introduction

Category 5 materials are materials that require special handling, placement and compaction procedures. These materials will be classified and designated in accordance with the approved RODs and the WAC. This section of the IMP Plan establishes procedures for disposal of impacted material that require special handling.

Materials either nominally larger than the physical criteria for the OSDF as identified in Section 4.3 Physical Criteria of this IMP Plan, or not reasonably anticipated by the currently identified categories in this IMP Plan, will require specialized placement plans to be developed on an as needed basis. Such plans would be developed by the OSDF project team with the assistance of the resident engineer as appropriate, and submitted to the regulatory agencies for review and approval prior to utilization. It is anticipated that such plans would be submitted concurrent with remedial action planning documents which identify items for special handling, or following the discovery of unexpected materials outside the current categorizations. Once approved, these specialized placement plans either would become addenda to this IMP Plan, or the appropriate section(s) of this IMP Plan would be revised accordingly.

8.6.2 General

Impacted materials suitable for placement in the OSDF that require special handling include:

- highly-compressible impacted materials not suitable for lateral spreading as a Category 4 material (*e.g.*, double-bagged asbestos);
- piping insulated with asbestos containing material (ACM); and
- sludges.

Placement and compaction procedures for these types of impacted materials are presented below.

8.6.3 Highly Compressible Materials

Placement

The volume of highly compressible material, such as double-bagged asbestos, requiring OSDF disposal is very limited. The primary criterion regarding the placement of asbestos is that the material be placed and compacted in a manner protective of the health of OSDF personnel and the public. A secondary criterion is to prevent significant differential settlement of the OSDF final cover system resulting from compression of this material.

Prior to placement of any highly compressible material in the OSDF, a trench shall be dug into previously placed and compacted Category 1 material. Material excavated from this trench shall be stockpiled at least 6 ft. (1.8 m) away from the trench opening. No trenches shall be dug into layers containing Category 2 through 5 material, nor through the protective, contouring, or select impacted material layers. Trenches shall be of uniform width (between 2.0 and 3.0 ft. (0.6 and 0.9 m) wide) and of a uniform depth (between 3.0 and 4.0 ft. (0.9 and 1.2 m) deep). The final sizing of the trench shall depend on the nature and size of the material to be disposed. Highly compressible material, such as double-bagged asbestos, shall be deposited in the lower half of the trench.

Compaction

An initial soil (Category 1 material) cover between 12 and 18 in. (300 and 450 mm) loose thickness shall be placed on top of the highly-compressible material in the trench. The initial soil cover layer shall be compacted with a minimum of four passes of a portable flat-plate or miniature roller compactor. Intermediate 6- to 12-in. (0.15- to 0.3-m) thick loose soil lifts shall be placed in the trench and compacted to at least 90 percent of the standard Proctor dry density determined as described in Section 7.4.2 of this IMP Plan. A final trench soil lift shall be placed to a compacted height (at least 90 percent of the Standard Proctor dry density) and at least 2 in. (50 mm) above the trench shoulders. The sequencing of material placement is illustrated in Figure 8-2.

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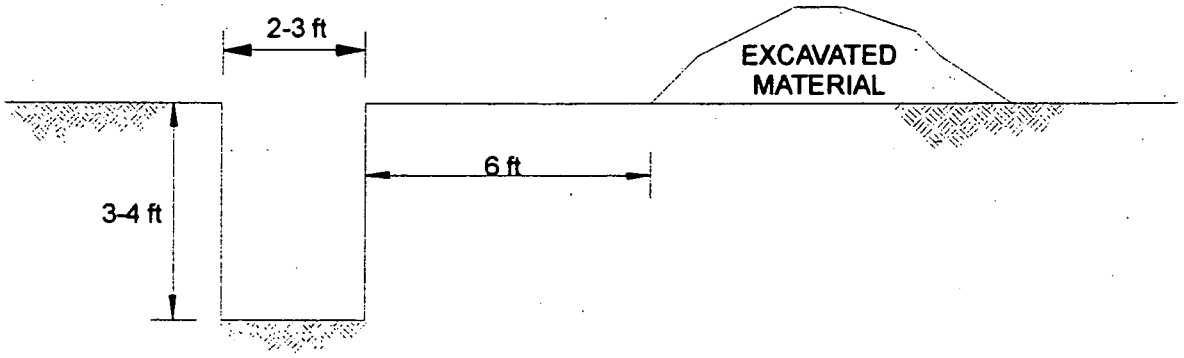
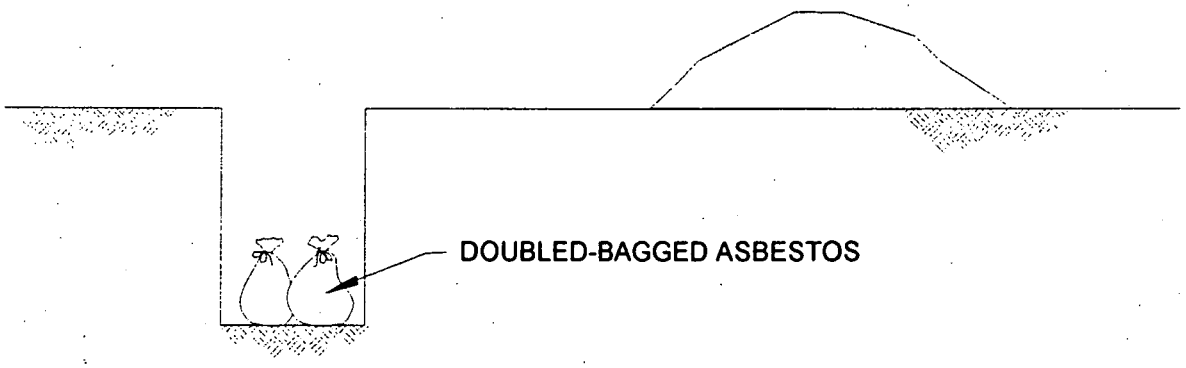
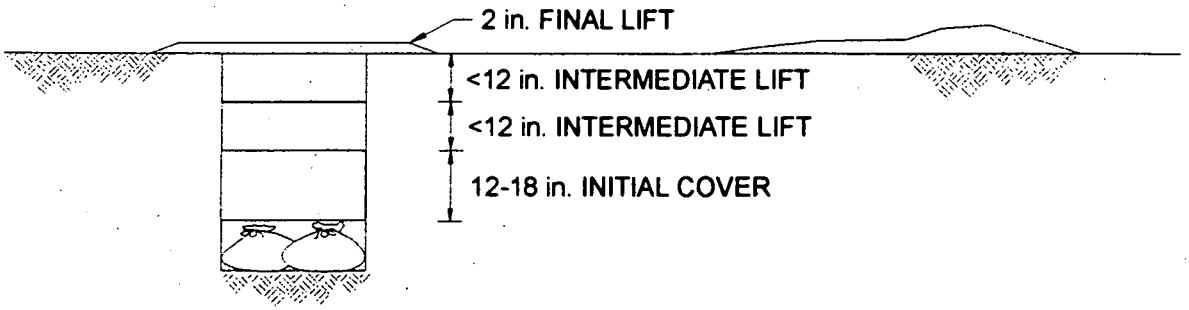
CATEGORY 5 MATERIAL PLACEMENT SEQUENCE



1. TRENCH DUG AND EXCAVATED MATERIAL STOCKPILED



2. CATEGORY 5 MATERIAL DEPOSITED IN TRENCH



3. FINAL TRENCH LIFT PLACED

NOTE: THIS FIGURE FOR ILLUSTRATION ONLY. SUBCONTRACTOR SHALL PLACE IMPACTED MATERIAL LAYERS TO THE LIMITS SHOWN ON CONSTRUCTION DRAWINGS.

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FIGURE NO.	8-2
PROJECT NO.	GE3900-10.2
DOCUMENT NO.	F9620002.CDC
FILE NO.	FIG-6-3.CDR

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8.6.4 Piping Containing ACM Insulation

Placement

The disposal of ACM-insulated piping in the OSDF shall be performed in a manner protective of the health of OSDF personnel and the public. These materials must be segregated from other demolition debris at the source and delivered to the OSDF in a condition suitable for placement in an excavation dug into previously placed and compacted Category 1 material. The size and shape of the excavation will be based on the predominant dimension and condition of the piping. If the piping comes to the OSDF in relatively straight lengths, the pipes shall be placed in trenches similar to those required for double bagged asbestos. If the piping comes to the OSDF in random shapes, bends, or curvatures, the pipes shall be placed in a rectangular excavation sized to accommodate the pipe but not greater than 20 ft. (6 m) square and 4 ft. (1.2 m) deep. Pipe should be cut to lengths allowing placement in the 20-foot excavation and be placed such that soil can be filled around pipes. The number of pipes placed in the 20-foot excavation is limited to that number that can be placed such that soil in-filling around the pipes is possible. The ACM-insulated piping shall be placed in the lower half of the excavation.

Compaction

An initial soil (Category 1 material) loose lift between 12 and 18 in. (300 and 450 mm) thick shall be placed on top of the ACM-insulated piping in the excavation. The initial soil cover layer shall be compacted with a minimum of four passes of a portable flat-plate or miniature roller compactor or a pad-foot compactor such as the Caterpillar 815C as appropriate. Intermediate 6 to 12 in. (150 to 300 mm) loose soil lifts shall then be placed in the excavation and compacted to at least 90 percent of the standard Proctor dry density, determined as described in Section 7.4.2 of this IMP Plan. A final excavation soil lift shall be placed to a compacted height at least 2 in. (50 mm). above the excavation shoulders.

8.6.5 Sludges

Placement

The placement, spreading, and compaction of the sludge material from the Lime Sludge Ponds or the AWWT will depend on the water content of the sludge when delivered to the OSDF. Sludge materials from the Lime Sludge Ponds should be mixed with soils from the berms of the ponds as much as practicable during excavation or drying until excessive moisture is removed. The objective of this activity is to decrease the moisture content of the sludges and thereby improve their handling and subsequent compaction characteristics. The CM may specify additional source(s) of materials for mixing with the sludges to achieve the required handling and placement characteristics. The following procedure assumes the sludge can be placed and compacted with conventional construction equipment, either by mixing as above in the case of the Lime Sludge Ponds, or by proper preconditioning (dewatering or drying) in the case of the AWWT sludges. In no case shall mixing and preconditioning be performed in the OSDF active cell.

Prior to placement of the first lift of sludge material, the surface of in-place impacted material shall be prepared with starter berms at least 12 in. (300 mm) high. Sludge materials shall be placed within the starter berms to a maximum loose thickness of 12 in. (300 mm.).

Compaction

Initial compaction shall be accomplished as the material is spread. After spreading and initial compaction, the material shall be compacted by a minimum of four passes of a bulldozer of a minimum total weight of 50,000 lb (220 kN) producing a ground pressure of at least 10 psi (70 kPa). Prior to placement of the second and succeeding lifts of sludge materials, a 12 in. (300 mm) thick lift of soil (Category 1 material) shall be placed above the sludge lift and compacted to at least 85 percent of the standard Proctor dry density for the soil. After placement of the soil lift, another starter berm shall be constructed as with the first lift of sludge material. Compaction of all succeeding lifts of sludge materials shall be identical to the first lift. Not more than two lifts of sludge material shall be placed in a horizon without a minimum 4 ft. (1.2 m) thick intervening horizon of Category 1 material.

After each sequence of sludge and covering soil placement, the cover soil shall be proof-rolled. The proof rolling equipment shall have a minimum gross vehicle weight of 20 tons (180 kN) and exert a ground pressure of at least 65 psi (450 kPa). Soft spots indicated by tire ruts more than 2 in. (50 mm) in depth or visible deflection under the moving proof rolling equipment shall be stabilized through additional passes of the compactor. Any soft spot that cannot be stabilized with further compactive effort shall be cause for additional treatment to the satisfaction of the CM. This treatment shall consist of removal, replacement, and recompaction of the soil material, and, if needed, infilling soft spots/areas in the Category 5 material with grout or other material approved by the CM.

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9.0 IMPACTED RUNOFF AND FUGITIVE DUST CONTROL

9.1 General

This section of the IMP Plan provides the requirements for impacted runoff and fugitive dust control within the OSDF battery limit as it relates to impacted material placement. Within the OSDF battery limit, all impacted material placement activities shall be confined to within the OSDF cell lined area. Activities related to the collection, handling, staging, loading, and transportation of impacted materials outside the OSDF battery limit are addressed as part of other work plans prepared as a part of the integrated FEMP remediation.

9.2 Runoff Control

9.2.1 OSDF Cell

Impacted runoff will be generated whenever precipitation comes in contact with impacted materials. Impacted runoff generated within the OSDF cell shall be managed as stated in Section 6.9 of this plan and in general conformance with the requirements of the *OSDF SWMEC Plan*. Impacted runoff shall be conveyed using temporary surface-water management structures to the impacted-runoff catchment area in the southwest corner of the most southerly active cell. As previously described in this plan, layers of impacted material shall be placed from north to south and east to west within each cell. As these layers are placed, the impacted-runoff catchment area shall be preserved until a more southerly cell is made active.

9.2.2 Impacted Material Haul Road

Impacted runoff from an impacted material haul road shall be contained within the boundaries of the road until it enters a sump at the western most end of the road. From this sump, the impacted runoff shall be routed to the storm drainage control of the FEMP former production area, or to other on-site wastewater collection/conveyance points acceptable to the CM.

9.3 Fugitive Dust Control

9.3.1 General

Fugitive dust may result from impacted material handling and hauling activities. Material handling covers such activities as excavation, dumping, spreading, compacting, and short-term storage. These activities may generate fugitive emissions in the form of particulate matter released to the air (*i.e.*, dust). These activities will comply with the BAT determination for remedial construction activities on the FEMP site that was developed to control fugitive dust (see Appendix B). The appropriate records shall be kept when visible emissions observations are performed in accordance with Appendix A of 40 CFR Part 60, and the FEMP procedure for fugitive dust control requirements, which is currently being developed.

The Subcontractor shall also control fugitive dust while hauling impacted materials to the OSDF. If visible emissions are in excess of the limit discussed in the BAT determination for remedial construction activities on the FEMP site, the CM will direct the Subcontractor to provide a corrective action plan.

As appropriate, the Subcontractor shall use one or more of the following for the control of fugitive dust from the OSDF:

- water sprays;
- crusting agents;
- operational controls; and
- wind screens.

Each of the above controls is briefly discussed in the following subsections.

9.3.2 Water Sprays

The Subcontractor shall use water distributors and spray trucks to control fugitive dust emissions in active OSDF cells and along impacted-material haul roads within the battery limit. The frequency of water application should be weather dependent and be adjusted based on the appearance of visible dust as described in the BAT determination for remedial construction activities on the FEMP site.

9.3.3 Crusting Agents

The Subcontractor shall consider the use of crusting agents or other suitable dust suppression chemicals whenever water is not effective or when a particular area will not be disturbed for long enough to justify the additional cost. The Subcontractor shall demonstrate to the CM the compatibility of any crusting agent or other suitable dust suppression chemical with components of the OSDF liner system prior to use.

9.3.4 Operational Controls

The Subcontractor may use operational controls to limit fugitive dust. Limiting placement of impacted material to days when the wind is calm, and limiting the speed of hauling equipment, are examples of operational controls. The Subcontractor shall work closely with the CM in the development and implementation of other beneficial operational controls to be implemented both on a daily and overall basis.

9.3.5 Wind Screens

The OSDF will be elevated above surrounding lands during its operational life. Increased winds at the higher elevation may cause additional fugitive dust during periods of operation at the higher

elevations. Silt fence on impacted material slopes installed for the control of surface erosion caused by precipitation may provide a measure of protection from winds. The Subcontractor shall consider the use of additional wind screens when other methods of fugitive dust control prove ineffective.

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10.0 REQUIRED DOCUMENTATION

10.1 General

This section of the IMP Plan contains information on the documentation required for each truck load of impacted materials to be placed in the OSDF.

10.2 Manifesting System

No impacted material will be accepted at the OSDF without an accompanying impacted material transportation "manifest". The purpose of the "manifest" is to provide a tracking mechanism for impacted material from the remediation project of origin to placement in the OSDF.

Information anticipated to be included on the "manifest" include:

- originating remediation project (*e.g.*, operable unit and project);
- date and time of origination (*e.g.*, loading for debris, excavation for other materials);
- brief visual description of the impacted material in the load;
- classification of the impacted material into one of the five material categories of this IMP Plan;
- signature by originating remediation project representative that the material meets the criteria in Section 4.0 of this IMP Plan;
- Subcontractor (transporter) signature;
- date and time of receipt; and
- CQC Consultant signature.

10.3 Impacted Materials Tracking

To aid in tracking impacted material, each impacted material transportation "manifest" will have a unique serial number and two carbon copies. One carbon copy each will be forwarded to the remediation project from which the impacted material originated and to the OSDF Subcontractor. The original will be retained by the CQC Consultant verifying that the impacted material has been disposed in the OSDF.

10.4 Records Procedures

FDF will be responsible for establishing the procedures and requirements for collection, storage, maintenance, and disposition of all OSDF records. Records shall be protected from damage or deterioration by being placed in lockable, fire-proof filing cabinets and by duplication and/or microfilming. Records shall be filed in accordance with the subject file index and shall be retained for 30 years after closure of the OSDF. Required records shall include, but not be limited to, field logbooks, other data collection forms, equipment calibration records, cost data, drawings, impacted material transportation "manifests", maintenance records, and associated reports.

All original data collected in the field shall be considered a permanent record. This includes all field logbooks, other data forms, and photographs. All of these documents shall be authorized by the signature and date of the originator. Errors shall be corrected by crossing a single line through the error and entering the correct information. Corrections will be initialed and dated by the person making the correction.

11.0 SEASONAL COVER

11.1 Description of System

At the end of each construction season and in any area where impacted material will not be placed for at least 30 days, a seasonal cover will be required over any area that has not received final cover. The seasonal cover will consist of natural or impacted soil with suitable surface protection, crusting agents, or geosynthetic erosion control surface matting.

11.2 Seasonal Cover Inspection and Monitoring Activities

The seasonal cover shall be inspected and monitored in accordance with the schedule and activity requirements presented in Table 11-1. The purposes of the inspection and monitoring activities are to: (i) ensure the seasonal cover prevents excessive fugitive dust and slope erosion; (ii) provide adequate and efficient management of impacted runoff within a cell; and (iii) provide adequate protection of liner systems components from freeze/thaw and mechanical damage.

Inspections of the seasonal cover shall consist of a survey of the seasonally-covered area. The visual inspection shall be conducted by either traversing the cover systems on a 100 ft. (30 m) grid pattern or by using binoculars to inspect areas where surface crusting agents have been applied. Suspect areas shall be delineated on a plan of the site. The inspections shall result in evaluation of the seasonal cover for excessive erosion or gullying. Should such conditions be observed, the Subcontractor shall implement activities to reduce such erosion or gullying, including regrading the eroded area, compacting exposed soil surfaces, rerouting runoff from the area to promote sheet flow, applying additional surface crusting agent, or installing geosynthetic erosion-control surface matting.

The seasonal cover inspections shall also include observation of the area within the active OSDF cell being used for impacted runoff catchment. The runoff from the seasonal cover will be collected in the leachate collection system (LCS) or managed as impacted stormwater. The inspection shall confirm that runoff into the area can infiltrate in an unimpeded manner into the cell LCS. Should the depth of sedimentation exceed 6 in. (150 mm) in any portion of this area, the sediment should be excavated and transported to an area of the cell outside of the impacted runoff catchment area. Any excavation of sediment within the cell shall be performed with extreme care so as not to damage the underlying liner systems. Should the granular protective layer or geotextile LCS filter in the stormwater catchment area of the cell become clogged and impede stormwater percolation into the LCS, the CM may instruct the Subcontractor to replace the granular material, and possibly the geotextile filter as well.

Repairs to a cell stormwater catchment area shall not be made unless it is part of a plan reviewed by the CM. Any repair activity involving any component of the liner systems or final cover systems shall be in full conformance with the construction specification for that component.

11.3 Recordkeeping

The Subcontractor shall maintain written records of all monitoring, inspections, and repairs in accordance with recordkeeping and reporting requirements of Section 10.4 of this IMP Plan.

TABLE 11-1

SEASONAL COVER
INSPECTION AND MONITORING ACTIVITIES

Component	Inspections: Seasonal-Closure Period	Condition	Maintenance
Seasonal Clover	Bi-weekly	• unacceptable surface or slope erosion	• regrade material surfaces; reroute runoff; compacted soil surface, apply crusting agents or geosynthetic erosion control matting
		• unacceptable fugitive emissions	• apply surface crushing agent or geosynthetic erosion control matting; install wind screen fencing
Impacted-Runoff Retention Area (in cell)	Bi-weekly	• sediment deposited on top of drainage area	• remove and deposit in outside of drainage area
		• lack of timely percolation of drainage into the LCS	• replace clogged protective layer granular material with new clean material; replace clogged geotextile filter layer
Protection of Liner System	Bi-weekly	• system must be protected against frost and mechanical damage by at least 2 ft Category 1 material	• add soil cover over anchor trench geosynthetics

12.0 REFERENCES

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GeoSyntec Consultants, *Design Criteria Package*, Atlanta, GA, 1997b.

GeoSyntec Consultants, *Final Design Package, On-Site Disposal Facility*, Atlanta, GA, 1997c.

GeoSyntec Consultants, Surface Water Management and Erosion Control Plan, Atlanta, GA, 1997d.

U.S. Department of Energy (DOE), *Final Record of Decision for Remedial Actions at Operable Unit 2*, Fernald Environmental Management Project, DOE Fernald Field Office, Fernald, OH, 1995a.

U.S. Department of Energy (DOE), *Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2*, Fernald Environmental Management Project, DOE Fernald Field Office, Fernald, OH, 1995b.

U.S. Department of Energy (DOE), *Final Remedial Investigation Report for Operable Unit 2*, Fernald Environmental Management Project, DOE Fernald Field Office, Fernald, OH, 1995c.

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U.S. Department of Energy (DOE), *Operable Unit 3 Record of Decision for Final Remedial Action*, Fernald Environmental Management Project, DOE Fernald Field Office, Fernald, OH, 1996b.

U.S. Department of Energy (DOE), *Permitting Plan and Substantive Requirements for the On-Site Disposal Facility*, Fernald Environmental Management Project, DOE Fernald Field Office, Fernald, OH, 1997a.

U.S. Department of Energy (DOE), *Systems Plan, On-Site Disposal Facility*, Fernald Environmental Management Project, DOE Fernald Field Office, Fernald, OH, 1997b.

U.S. Department of Energy (DOE), *Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility*, Fernald Environmental Management Project, DOE Fernald Field Office, Fernald, OH, 1997c.

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APPENDIX A

IMPACTED MATERIALS PLACEMENT QUALITY ASSURANCE PLAN

Fernald Environmental Management Project
Fernald, Ohio

TABLE OF CONTENTS

A.1 INTRODUCTION

A.1.1 Overview

This IMP Quality Assurance (QA) Plan describes the activities which shall be undertaken throughout the construction, placement, and closure of the OSDF to assure the acceptance, filling, and compaction of the impacted materials in the OSDF are in accordance with the procedures established in the *IMP Plan* and *CQA Plan*. This plan contains requirements and procedures specifically applicable to impacted materials after they are brought into the OSDF battery limit.

A.1.2 Plan Scope

This IMP QA Plan establishes the QA/QC procedures and documentation practices to be used to monitor and test impacted materials which are transported, placed, and compacted by the Subcontractor within the OSDF battery limits. The scope of this plan includes:

- CQC Consultant duties related to impacted materials; and
- monitoring, testing, and documentation procedures to be used in assuring impacted material placement is in accordance with the requirements of the *IMP Plan*.

A.1.3 Plan Organization

The remainder of this plan is organized as follows:

- the job descriptions, qualifications, and required training of personnel involved in IMP QA are presented in Section A.2;
- specific monitoring procedures are presented in Section A.3;
- specific compaction testing requirements for each impacted material category are presented in Section A.4;
- requirements for as-placed plans are presented in Section A.5.

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A.2 IMP QA PERSONNEL

A.2.1 Staffing Requirements

Monitoring and testing of the placement and compaction of impacted materials at the OSDF shall be the responsibility of the CQC Consultant. The following personnel shall have responsibilities related to the impacted materials placement QC activities at the OSDF:

- CQC Managing Engineer;
- CQC Site Manager; and
- CQC Field Monitors.

A.2.2 CQC Managing Engineer

A.2.2.1 Job Description

The CQC Managing Engineer shall be in overall charge of the QC activities related to impacted material placement. In addition to the duties described in the *CQA Plan*, the CQC Managing Engineer shall also be responsible for monitoring of the impacted materials placement and compaction in the OSDF.

A.2.2.2 Required Job Qualifications

The required qualifications of the CQC Managing Engineer are contained in the *CQA Plan*.

A.2.3 CQC Site Manager

A.2.3.1 Job Description

The CQC Site Manager shall be in direct day-to-day charge of the QC monitoring conducted at the OSDF during impacted materials placement. In addition to the duties described in the *CQA Plan*, the CQC Site Manager shall also be responsible for:

- Monitoring impacted materials suitability for disposition in the OSDF.
- Evaluating the compaction of the impacted materials in the OSDF.
- Supervising the compaction testing of impacted materials in the OSDF.
- Assigning CQC Field Monitors.
- Forwarding required documentation to the CQC Managing Engineer.

- Assuring that CQC Field Monitors attend regular health and safety meetings.

A.2.3.2 Required Job Qualifications

The qualifications of the CQC Site Manager are contained in the *CQA Plan.*

A.2.4 CQC Field Monitors

A.2.4.1 Job Description

CQC Field Monitors shall perform placement monitoring and compaction testing of impacted materials in the OSDF in accordance with this IMP QA Plan. Placement monitoring and compaction testing shall include documentation that the Subcontractor is performing in accordance with the procedures specified in the *IMP Plan.* Monitors shall also classify, as necessary, the impacted materials for the purposes of assigning a compaction method to the impacted materials.

A.2.4.2 Required Job Qualifications

CQC Field Monitors shall have experience in performing QC in earthwork construction, demolition, or solid waste industries or in an equivalent industry.

A.2.5 Training

Training requirements for personnel employed at the FEMP are contained in the Fernald Site Wide Training Plan - PL-3032 [FERMCO, 1995]. Personnel engaged in impacted materials QA/QC activities at the OSDF shall be trained in accordance with this plan.

Each CQC Consultant employee shall have OSHA 40-Hour Hazardous Waste Workers' Health and Safety Training (HAZWOPER) conducted in accordance with 29 CFR 1910.120. Each employee shall also take an 8-hour Hazardous Waste Workers' Health and Safety Training refresher course each year, and no more than 1 year from the date of completion of the 40-hour HAZWOPER training. The CQC Site Manager shall receive 8-hour HAZWOPER Supervisory training.

Each new employee shall receive 3 days of on-the-job training as required by 29 CFR 1910.120. On-the-job training will include, at a minimum, a discussion of site specific health and safety features, a walk-through of the areas in which the new employees will be working with a discussion of possible hazards in the area, a discussion of job duties and potential hazards associated with the duties and a discussion regarding appropriate personal protective equipment (PPE) including minimum requirements for work clothing in accordance with the site specific health and safety plan.

A.3 IMPACTED MATERIALS MONITORING

A.3.1 Required Documentation

Upon entering the OSDF battery limits, the CQC Consultant shall check that the impacted materials are accompanied by a "manifest" and that the hauling unit has been properly identified as to the impacted material category. Impacted material categories are defined in Section 5.2 of the *IMP Plan*. If no material category has been entered onto the manifest, the hauling unit shall be turned around and sent back to its point of origin. The CQC Consultant shall verify that the "manifest" contains all information relating to the impacted material origin as specified by Section 10.2 of the *IMP Plan*. The CQC Consultant shall complete the "manifest" by recording any pertinent notes, comments, or observations about the load. The CQC Consultant shall finally affix a signature to the "manifest" verifying that the load has been delivered in accordance with the *IMP Plan*.

A.3.2 Visual Inspection

The CQC Consultant shall perform a visual review of the impacted materials entering the OSDF. The contents of each hauling unit (truck load or containers) shall be viewed after dumping to assure that the contents match the visual description entered on the "manifest".

A.3.3 Monitoring for Moisture Content

Impacted materials accepted at the OSDF shall be at a moisture content suitable for placement and compaction in accordance with the *IMP Plan*. If the CQC Consultant determines that impacted materials are too wet, the Subcontractor shall dry the material to a condition allowing placement and compaction in accordance with the *IMP Plan*.

A.3.4 Demolition Debris Monitoring

General

The CQC Consultant shall monitor demolition debris delivered to the OSDF. Additional information regarding waste classification and special handling of specific types of demolition debris is presented in the following sections.

Asbestos

Trucks carrying double-bagged regulated asbestos containing material must display asbestos warning signs. The Subcontractor shall comply with all regulations relating to the handling and transportation of regulated asbestos containing material.

Broken Concrete

Most concrete demolition debris will fall into Category 2 (*en masse* placement). Loads of concrete containing concrete pieces that cannot be spread into 18 in. (450 mm) loose lifts will be classified as Category 5 materials.

Steel or Transite Sidings

Steel or transite sidings that arrive at the OSDF in neatly packaged stacks not greater than 4 ft. (1.2 m) high will be classified as Category 3 items (individual placement). Loose truck loads of miscellaneous demolition debris containing steel sidings that can be spread in lifts not higher than 18 in. (450 mm) will be classified as Category 2 materials (*en masse* placement).

Steel Beams

Steel beams which can be spread or placed into a lift no higher than 18 in. (450 mm) will be classified as Category 2 materials (*en masse* placement).

Wood

Loads of demolition debris consisting primarily of wood and that can be spread in lifts no higher than 18 in. (450 mm) will be classified as Category 4 materials (highly compressible).

Miscellaneous Demolition Debris

Loads of miscellaneous demolition debris (doors, plumbing, wiring, *etc.*) that can be spread in lifts no higher than 18 in. (450 mm.) will be classified as Category 2 materials (*en masse* placement). Miscellaneous demolition debris that can be placed individually such that the highest part of the debris is not more than 4 ft. (1.2 m) above the ground surface will be classified as Category 3 items (individual items).

Tanks

Tanks that cannot be placed such that the void space can be filled and Category 1 material placed and compacted around them shall not be placed in the OSDF. Pressurized or pressurizable cylinders which have not been cut in half such that they cannot contain pressurized materials will not be accepted at the OSDF. Tanks acceptable for placement in the OSDF and which are less than 5 ft. (1.5 m) in diameter and 4 ft. (1.2 m) high will be classified as Category 3 items (individual items).

Pipes

Steel pipes which can be spread or placed into a lift no higher than 18 in. (1.5 ft.) will be classified as Category 2 materials (*en masse* placement). Piping with a nominal diameter of 12 in. (300 mm) or greater will be split in half before disposal.

A.4 IMPACTED MATERIAL PLACEMENT AND COMPACTION

A.4.1 Category 1 Materials (Soils and Soil-Like)

General Monitoring Requirements

Monitoring the placement and compacting of impacted soil and soil-like materials includes the following:

- testing to determine the water content and other physical properties of the impacted soil materials during processing, placement, and compaction;
- monitoring the thickness of lifts as loosely placed and as compacted; and
- monitoring the action of the compaction and heavy hauling equipment on the construction surface (sheepsfoot penetration, pumping, cracking, etc.).

Placement and Compaction Quality Control

The standard Proctor test (ASTM D 698) shall be used for the determination of moisture/density relationships on the Category 1 material to be disposed in the OSDF. The standard Proctor tests will be performed in the on-site geotechnical laboratory established per the *CQA Plan*. Additional Proctor testing will be performed with each change in material type.

The dry density, moisture content, and loose lift thickness of Category 1 materials shall be measured at a minimum frequency of once per 10,000 ft^2 (930 m^2) *or* once per 100 ft. by 100 ft. (30 m by 30 m) grid element per lift; measurement of dry density and moisture content are to be in accordance with ASTM D 2922 and D 3017 (nuclear methods). To establish correlations of moisture and density with the nuclear methods, the sand cone test method (ASTM D 1556) shall be used once per day when Category 1 materials are placed. The sand cone correlation will also be used to evaluate the effect impacted materials may have on the nuclear densitometer.

Compaction testing for Category 1 materials will be documented in accordance with procedures established in the *CQA Plan*.

Rework

At locations where the field testing indicates densities below the requirements of the *IMP Plan*, the failing area shall be reworked.

Lines and Grades

Surveying of lines and grades shall be conducted by the Subcontractor on a periodic basis during the depositing of the impacted materials. The CQC Consultant shall monitor the surveying to

ensure that slopes are properly constructed to promote proper drainage and assure that required separation distances are maintained. Any deviation from the *IMP Plan* procedures shall be reported to the CM for corrective action.

A.4.2 Category 2 Materials (*En Masse* Placement)

Placement Quality Control

The CQC Consultant shall monitor and document that the placement of Category 2 materials is in accordance with the *IMP Plan*.

Monitoring of placement by the CQC Consultant shall include verification that:

- loose lift thickness is no more than 18 in. (450 mm) to 21 in. (530 mm));
- category 1 materials are worked into the lift as much as practical;
- horizontal extent of a lift is no more than 100 ft. (30 m) and each lift is surrounded with 10 ft. (3 m) of Category 1 material; and;
- horizons are limited to two lifts and separated vertically by a 4 ft. (1.2 m) horizon of Category 1 materials

Compaction Quality Control

The CQC Consultant shall monitor and document that the Category 2 materials have received the compaction effort specified by the *IMP Plan*. Category 1 materials used to cover each lift of Category 2 material shall be tested in accordance with Section A.4.1.

Compaction testing of Category 1 materials covering the Category 2 material shall be documented in accordance with procedures established in the *CQA Plan*.

Rework

At locations where the field testing indicated densities below the requirements of the *IMP Plan*, the failing area shall be reworked.

A.4.3 Category 3 Items (Individual Items)

Placement Quality Control

The CQC Consultant shall monitor and document that the placement procedures presented in Section 8 of this *IMP Plan* are followed by the Subcontractor in the placement of Category 3 items.

Monitors will observe and document that the maximum lift thicknesses of Category 1 materials placed around the individually placed items are in accordance with the *IMP Plan*.

Compaction Quality Control

The CQC Consultant shall monitor and document that the Category 1 materials used in the placement of Category 3 items have received the compaction effort specified by the *IMP Plan*. Category 1 materials used in the placement of Category 3 materials shall be tested in accordance with Section A.4.1, but at a frequency as follows:

- for soil cover lifts, once per each soil cover lift, and
- for side berms, once per 250 ft. length but not less than twice per grid element.

Compaction testing of Category 1 materials used in the placement of Category 3 items shall be documented in accordance with procedures established in the *CQA Plan*.

Rework

At locations where the field testing indicates densities below the requirements of the *IMP Plan*, the failing area shall be reworked.

A.4.4 Category 4 Materials (Highly Compressible)

Placement Quality Control

The CQC Consultant shall monitor and document that the placement procedures presented in Section 8.0 of the *IMP Plan* are followed by the Subcontractor in the placement of Category 4 materials. Monitors shall observe and document that maximum loose lift thicknesses are in accordance with the *IMP Plan*.

Compaction Quality Control

The CQC Consultant shall monitor and document that the Category 4 materials, and the Category 1 materials used in the placement of Category 4 materials, have received the compacting effort specified by the *IMP Plan*. Category 1 materials used in the placement of Category 4 materials shall be tested in accordance with Section A.4.1, but at a frequency as follows:

- for side berms, once per 250 ft. length but not less than twice per grid element; and
- for cover lifts, once per each soil cover lift.

Compaction testing for Category 1 materials will be documented in accordance with procedures established in the *CQA Plan*.

Rework

At locations where the field testing indicates densities below the requirements of the *IMP Plan*, the failing area shall be reworked.

A.4.5 Category 5 Materials (Special Handling, Placement and Compaction)

Placement Quality Control

The CQC Consultant shall monitor and document that the placement procedures, trench/excavation dimensions or berm heights, maximum loose left thicknesses, and compacted height of final soil lifts are in accordance with the *IMP Plan* (or its appropriate addenda).

Compaction Quality Control

Highly Compressible Materials and Piping Containing Asbestos Insulation

The CQC Consultant shall monitor and document that the Category 1 materials used in the placement of these Category 5 materials (*IMP Plan* Sections 8.6.3 and 8.6.4, respectively) have received the compaction effort specified by the *IMP Plan*. Category 1 materials used in the placement of these Category 5 materials shall be tested in accordance with Section A.4.1, but at a frequency as follows:

- for initial soil cover lifts in trenches or excavations, no testing is necessary or desired aside from observing compaction passes; and
- for subsequent soil cover lifts in trenches or excavation, once per each soil cover lift in each trench or excavation.

Compaction testing of Category 1 materials used in the placement of these Category 5 materials shall be documented in accordance with procedures established in the *CQA Plan*.

Sludges

The CQC Consultant shall monitor and document that the Category 1 materials used in the placement of these Category 5 materials, and these Category 5 materials themselves, have received the compaction effort specified by the *IMP Plan*.

Category 1 materials used in the placement of sludges shall be tested in accordance with Section A.4.1, but at a frequency as follows:

- for side berms, once per 250 ft. (76 m) but not less than a minimum of two per grid element; and

- for soil cover, once per each soil cover lift in each placement unit.

Compaction testing of these Category 5 materials, and Category 1 materials used in the placement of these Category 5 materials, shall be documented in accordance with procedures established in the *CQA Plan*.

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A.5 AS-PLACED PLANS

The CQC Consultant shall prepare as-placed plans for the completed impacted-materials placement activities. These plans shall report how much of each category of impacted material is in each grid element by lift with each cell. The Subcontractor shall allow for this activity in the scheduling of impacted materials placement and shall promptly furnish appropriate sketches, notes, files, and records to the CQC Consultant.

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APPENDIX B

BEST AVAILABLE TECHNOLOGY DETERMINATION FOR REMEDIATION CONSTRUCTION ACTIVITIES ON THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Category	Remediation Activities/Areas Included	Standard or Site-Specific Limit	Dust Controls/Work Practices*
Paved roadways and paved parking areas	Activities: • Hauling materials and equipment • Vehicle and equipment traffic Areas: All predetermined areas designed and improved specifically for vehicle traffic. Improvements include the application of materials such as asphalt or concrete that forms a firm level surface for travel.	Limit: There shall be no visible particulate emissions from any paved roadway or paved parking area except for a period of time not to exceed one minute during any sixty-minute observation period.	• Apply dust suppression agents. • Minimize the amount of unnecessary traffic on paved roadways used for hauling materials and vehicle/equipment traffic. • Limit speed to 15 mph or less during operation of equipment or vehicles. • Apply appropriate dust suppression agents such as water or surfactants to materials being transported by truck load beds to ensure the transported materials will not become airborne; cover truck load beds when transported materials are still likely to become airborne. • Wheel wash prior to entering paved roadways or paved parking areas. • Wet sweep or otherwise remove any clods, clumps, tracks, or visible deposits of soil or mud from paved roadways or paved parking areas, applying appropriate dust control measures to suppress the generation of visible dust that may result from the sweeping or removal process. • Repair or resurface paved roadways/parking areas as needed.
Unpaved roadways, unpaved parking areas, and wind erosion from storage piles	Activities: • Hauling materials and equipment • Vehicle and equipment traffic Areas: All predetermined areas designed and improved specifically for vehicle traffic. Improvements include the application of gravel, shredded shingles, cinders, compaction, etc. to the delineated areas.	Limit: There shall be no visible particulate emissions from any unpaved roadway, unpaved parking area, or wind erosion from a storage pile except for a period of time not to exceed three minutes during any sixty-minute observation period.	• Apply dust suppression agents. • Minimize the amount of unnecessary traffic on unpaved roadways or unpaved parking areas. • Limit speed to 15 mph during operation of equipment or vehicles. • Apply dust suppression agents such as surfactants or crusting agents to storage piles or cover with tarpaulin, plastic, etc., if practical; for extended periods of planned inactivity, vegetate as a last resort if protective cover or periodic application of crusting agent proves ineffective. • Apply appropriate dust suppression agents such as water or surfactants to materials being transported by truck load beds to ensure the transported materials will not become airborne; cover truck load beds when transported materials are still likely to become airborne. • Wheel wash prior to entering unpaved roadways or unpaved parking areas. • Remove, as practical, any clods, clumps, tracks, or visible deposits of soil or mud from unpaved roadways or unpaved parking areas. • Repair or resurface roadways/parking areas as needed or use an alternative road surface as a last resort.

Category	Remediation Activities/Areas Included	Standard or Site-Specific Limit	Dust Controls/Work Practices*
Project field activities and material handling/vehicle traffic on storage piles	Activities: • Excavation • Trenching • Loading/Unloading • Transportation to defined roadway (paved or unpaved) • Load-in/Load-out on storage piles • Material placement in Onsite Disposal Cell • Vehicle traffic on storage piles Areas: • Working faces • Transition areas between working faces and defined roadways (paved or unpaved) • Onsite Disposal Cell • Storage Piles	Standard: Visible particulate emissions from project field activities/areas shall not exceed twenty percent (20%) opacity as a three-minute average. (OAC 3745-17-07 (B)(1))	• Apply dust suppression agents. • Minimize the amount of unnecessary traffic in and around field activities. • Limit speed to 15 mph or less during operation of equipment or vehicles. • Reduce rate of excavation. • Minimize height of drop during loading and unloading. • Change method of excavation & transport (E.G., from front end loader dumping into a truck to self-propelled pan). • Apply dust suppression agents such as surfactants or crusting agents to storage piles. • Apply appropriate dust suppression agents such as water or surfactants to materials being transported by truck load beds to ensure the transported materials will not become airborne; cover truck load beds when transported materials are still likely to become airborne.

* to be applied progressively as environmental conditions dictate.